

# AMERICAN VETERINARY REVIEW.

DECEMBER, 1904.

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## EDITORIAL.

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### EUROPEAN CHRONICLES.

PARIS, October 15, 1904.

ACCOUSTOMANCY FROM REPEATED TUBERCULIN INJECTIONS.—In 1882, in his article on "Tuberculin," in the *Dictionnaire Vétérinaire Pratique*, Nocard stated that successive injections of tuberculin, repeated every day or several days apart, on tuberculous subjects of the bovine species, gave reactions gradually less marked. He said: "There is a true accoutumancy to the action of tuberculin; my observations seem to show that this accoutumancy is very short." Meanwhile, seeing the results that might ensue from this, he kept investigating the subject, and he obtained some results, but finally concluded by writing: "To obtain a second reaction on all sick animals, from twenty-five to thirty days—in round numbers, *a full month*—must elapse between the two injections. After this lapse of time, one month, it is rare for the reaction to be absent," and thus the general impression has remained.

However, taking into consideration the results that might occur from this state of affairs, such as the possibility of deceiving a buyer who would ask tuberculation of animal before purchasing; or, again, the fact that this accoutumancy might be used by fraudulent impostors when entering animals from one country to another; and, lastly, the fact of tuberculin failing to react might be taken advantage of by those who object to or do not believe in its properties of diagnosis. All these were important questions which demanded solution. Nocard and Roux had tried to find one, but failed, and the question re-

mained open, viz. : the discovery of a method by which all evidence of this *accoutumancy* to tuberculin could be removed. Prof. Vallé, of Alfort, the worthy successor of Nocard, has undertaken the task and published the results in the *Revue Générale*.

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It seems that Nocard in his experiments has followed the technic of the operation as it is ordinarily performed, viz. : after his various injections of tuberculin, he recorded the temperature every two or three hours, beginning only from the 11th or 12th hour after the injection. Vallé asked himself if a first injection of tuberculin to a tuberculous animal did not render it more sensitive to it (did not *sensibilise* it) and if then it would not react earlier and in a shorter manner after a second or third injection. He then experimented upon 36 bovines, which had been found tuberculous or were suspects at the first test with tuberculin and with them he found "that there was not one which seemed to be immune by a second test, made 48 or 36 hours only after the first, with a double dose of the same tuberculin, the temperatures being carefully taken every two hours, immediately after the second tuberculation."

"In other words," says Vallé, "I believe that I am authorized to conclude: (1) that in the very great majority of cases, *accoutumancy* of bovines to tuberculin does not exist; and (2) that tuberculous bovines react almost always to a second injection of tuberculin made shortly after the first, but that this secondary reaction is present early and lasts but a short time."

The following is the mode of conduct of the veterinarian in cases of doubt :

"Inject at 5 or 6 o'clock in the morning a double dose of tuberculin of that used ordinarily (8 c.c. to the 10th for large animals, 4 c.c. for small). Take the temperatures every two hours, from the time of the injection until towards the 14th or 15th hour. The reaction is measured by the difference between the temperature at the time of the injection and the highest of those manifested afterwards. Every animal which will have a

reaction of  $1.5^{\circ}$  may be considered as tuberculous ; a reaction between  $0.8^{\circ}$  and  $1.5^{\circ}$  means suspicion. It is evidently indicated that animals with a temperature of  $39^{\circ}$  need not be submitted to the test. Animals must not be allowed to drink during the hour which precedes the taking of the temperature."

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THE DISCOVERY OF RABID IMMUNITY.—The revendication to the title of a new discovery may not always be of great importance, but still there are, especially in medical sciences, many conditions where it is due to self pride to claim it. For this reason, *a page of history*, recorded a short while ago in the *Semaine Vétérinaire*, is certainly worth repeating. The subject relates to the discovery of rabid immunity, and to the antirabid vaccination by intravenous injection, which are claimed, with proofs, by Prof. V. Galtier, of the Veterinary School of Lyon. "Indeed," says the learned professor, "I was the first to prove, a long time before it was a question of vaccination by the method of Pasteur or any others, that *immunity* against deadly rabies could be conferred to some animals by a special mode of inoculation ; up to that time it was entirely unknown that a refractory state against rabies could be given ; it is then by my researches that the first demonstration, the discovery of rabid immunity, has been made. In 1881 I had demonstrated that injections of virus, rabid saliva, in veins of sheep or goats did not develop rabies and gave immunity ; thus showing, by proving that a refractory condition could be granted, that antirabid vaccination was possible, while no one yet had dreamt of it.

"These results had been communicated to the Académie of Médecine in 1881, then to the Académie des Sciences, and finally this body, of which Pasteur was then permanent secretary, reported through Mr. Bouchard in the name of a commission, where figured men like Narey, Richet, Charcot, Brown-Sequard and Vermeuil, as follows :

"The works of Mr. Pasteur on the pathology and prophylaxy of rabies have, in the last years, modified greatly our knowledge of the subject and brought us to unexpected con-

clusions. After the justice, which is to-day given to the brilliant discoveries of our illustrious colleagues, *it is proper to mention also the discoveries made in the same direction by one of the professors of the Veterinary School of Lyon.* Mr. Galtier, in the book which he has submitted for your appreciation, reviews the scientific standing of the subject and resumes his *own discoveries.* I will mention only one. The 29th of January, 1881, Mr. Galtier announced that the injection of rabid virus in the veins of sheep did not give that animal rabies, but conferred immunity upon it. In another note, Mr. Galtier renewed the same affirmation. In sheep the intravenous injection, without giving rise to the disease, produces nevertheless such change in the organism that the bite of a rabid dog does not give rabies. It was the application to rabies of a prophylactic measure that the Lyon School has the right to claim. *It was also the first demonstration of the possibility of conferring to certain animals immunity against rabies.'*"

So much credit, then, for the veterinary family!!

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INFECTIOUS ANÆMIA OF HORSES.—To avoid the necessity for revendication of priority relating to scientific discoveries, it is certain that those ought to be recorded as early as possible, almost as soon as made and proved correct, even if they are not yet entirely completed. This thought is suggested to me by an article that I have read in the *Revue of Leclainche*, on the *infectious nature of anæmia of horses*, published by Profs. Vallé and Carre, of Alfort. It seems that a serious and fatal outbreak exists in some parts of France. Observed in previous years and attributed to improper and insufficient feeding or other hygienic defectuous condition, it had also been considered by few as an affection of vermiform or microbial nature. The true nature of the disease, however, was made out lately by the professors working at the Laboratory for Researches in Infectious Diseases of Alfort. It is an infectious disease. Inoculated to a healthy, robust horse by 750 c.c. of defibrinated blood, it was followed by a typical disease which lasted 57 days. The number of he-

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matics dropped progressively from 7,800,000 to 5,700,000 on the 14th day, to 4,095,000 on the 44th, to 3,505,000 on the 50th, and to 2,280,000 the day the horse died. During the disease the weight of the animal dropped from 472 kilogs. to 315. At the post-mortem all the ordinary lesions were found. Unfortunately all the bacteriological researches made to discover the microbe, cause of the infection, have so far failed, and the authors say that it is proper to suppose that the virus of anæmia belongs to the group of *invisible* microbes so called, which, like those of yellow fever, foot-and-mouth disease, pleuro-pneumonia, etc., have the characteristic of passing through the filters which retain the microbe visible under the microscope. This anæmia of horses is evidently contagious and inoculable, a fact which justifies the supposition that other forms of anæmia may also be true infectious diseases. The disease, the properties of the virus, the therapeutic qualities of serotherapy, are still the subject of study at the hands of the learned professors, who certainly will let us hear from them soon again.

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PROTECTION FOR THE HANDS IN OPERATIONS.—Dangers of inoculation are probably less common in veterinary than in human medicine. Yet they are not without having been observed, and whether it is in making post-mortems, in examining animals affected with contagious diseases (such as glanders), in removing a diseased placenta, etc., there are with these conditions, indications for the protection of the hands. Or, even when it is simply a question of manipulation of some excreta, the use of rubber gloves is always in order. But these are not without objections, and, to remedy them, other means have been looked for which would fill up the same effect and be of easier application.

I read in one medical paper here, the *Journal de Médecine*, of a process which is attributed to Dr. J. B. Murphy, of Chicago, which seems to me very convenient. It is described as follows:

After washing his hands for five minutes with tincture of soap and then rubbing them with alcohol, he dries them thor-

oughly. Then pouring in the hollow of one hand a solution of one part of gutta-percha in 25 parts of benzine, the whole is spread thoroughly over both hands and forearms, with the principal care at the region of the nails and in the interdigital spaces. Keeping the hands open and fingers apart, this coating is allowed to dry. This takes two or three minutes. By this process, the skin is covered by an isolating, antiseptic, impermeable, soft, thin and transparent coat, insoluble in water or alcohol and therefore can be disinfected between the various steps of an operation. To remove it only a little friction with benzine is necessary, and underneath the epidermis remains soft and smooth. It has only one objection, which is that when an operation lasts too long, it may break off here and there on the fingers. However, the application of a little more of the solution of gutta-percha will readily remove the trouble. It may be possible that, the discovery of this method being American, some of our readers may already have known of it; but, again, they may not; hence my reasons for calling attention to it.

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SOME EUROPEAN VETERINARY SCHOOLS.—Allow me to close to-day with a few items on some of the veterinary colleges of Europe.

First of all, comes the plan of Prof. Williams. His plan has been realized—the old Veterinary College of Edinburgh has closed its doors, and there are now two veterinary schools in England, one in London, the other in Liverpool. The announcement was made in proper time in the English professional papers, and now, instead of the old advertising notice, to which English-reading persons have been used for so many years, we find that of the Veterinary School of Liverpool University. Prof. W. Owen Williams, of course, holds on to the reins, and will still look after the interests of the school of the new departure. We wish him the same success which was attained by the old Edinburgh institution, although the results of past and even present experience of veterinary colleges connected with universities may justify a certain amount of anxiety

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not only on our part, but also with those who take interest in such undertakings. Time will tell.

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Among the German schools, I have read of some little interesting points. First, it is upon the attendance at the various schools in the Empire. During the last semesters they show that in three sessions, including the summer of 1903, the winter of 1903-1904, and the summer of 1904, the schools of Berlin, Dresden, Giessen, Hanover, Munich, and Stuttgart, counted altogether 1,465 with 59 new scholars in 1903, 1,345 with 80 new students in 1903-1904, 1,337 and 78 new ones in 1904. The Berlin school has the largest number, then comes that of Munich, which in her class has 8 ladies.

The second question I have obtained information upon relates to the instruction. The question of amalgamating the school of Bavaria with the University remains still in doubt.

A post-graduate course has been established in the school of Hanover, where some of the best professors will deliver lectures. Profs. Dammann, Kaiser, Malkmus, Frick and Rievel form the faculty.

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In Italy reforms or improvements in veterinary education are also the order of the day. The Secretaries of the Interior and of Agriculture have decided to institute in the schools of Bologna, Milan, Naples, Pisa and Turin a special course, theoretical and practical, on sanitary police for students and practicing veterinarians. Sanitary police of contagious diseases, and especially those of swine and fowls, will be lectured upon.

A. L.

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#### THE VETERINARY CORRESPONDENCE SCHOOL.

For many months the REVIEW has been favored by its readers in various parts of the country with advertisements clipped from all kinds of newspapers referring to an alleged "school" located at London, Ontario. Some of our correspondents had replied to the advertisement, and had secured many answers—

in fact, a series of letters—all picturing the fortune in store for the lucky young man should he decide to take the course. In two instances the applicant was to manage a branch of the "school," receiving therefor an enticing salary, the only obligation resting upon him being that he should make himself familiar with certain instructions contained in the "guide book," for which he must pay three dollars in advance. The following is a copy of the latest "ad" sent in, and it comes all the way from Hawaii:

"YOUNG MEN, BECOME INDEPENDENT.—Our School can give you a Veterinary Course in simple English language, at home during five months of your spare time, and place you in a position to secure a business of from \$1,200 upwards yearly. Diploma granted and good positions obtained for successful students. Cost within reach of all. Satisfaction guaranteed. Write for full particulars at once. THE ONTARIO VETERINARY CORRESPONDENCE SCHOOL, London, Ontario, Canada."

It is printed here simply as a sample of those we have been receiving. Our Canadian brethren are working hard to secure an adequate law for Ontario that will probably be broad enough to cover this "school"; but in the meantime it is flooding this country with its literature and is evidently meeting with some success, as it has been in existence for a considerable time and is expending a large amount of money in advertising.

The only remedy for such a condition lies in the protective laws which the majority of States having any number of veterinarians have already secured; and it is an incentive to those States where no such laws exist to get them upon the statute-books as rapidly as possible. Then, should one of these "graduates" be found endeavoring to practice under such a "diploma," strike him with the arm of the law as you would any other pickpocket.

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WE present in this number the report by Prof. W. L. Williams of the clinics held in connection with the recent meeting of the New York State Veterinary Medical Society, and we submit that it is unique in its thoroughness and value. From the technic of the operations to their ultimate results nothing is

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omitted, and it makes intensely interesting reading for veterinary surgeons. It has been a stupendous task, and the profession is greatly indebted to Dr. Williams for his good work, for we know that he has devoted a great deal of time keeping in touch with all who were concerned in the clinics, and he converted his office into a veritable correspondence bureau in his efforts to have every detail verified. Taking the actual demonstrations and this faithful record of them together, who will say that clinics at association meetings are not helpful and educational and interesting? Instead of seeking to amputate the clinics from the A. V. M. A. meetings, let the committee in charge of them take note of the New York clinic, and profit thereby.

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DR. D. ARTHUR HUGHES, whose scholarly pen has recently added a number of valuable contributions to our literature through the pages of this journal, reviews in this number the present status of the question of immunization against bovine tuberculosis. For the year 1905 the same author has promised REVIEW readers a number of original papers, chief among which are: (1) "Scientific Work, Chiefly Veterinary and Agricultural, Carried on by the Government in Our Insular Possessions." (2) "The Social Standing of the Veterinarian." (3) "An Analysis of the Term 'Scientific Investigation' as Applied in Veterinary Sciences." (4) "A Striking Case of Elephantiasis of the Spleen of a Pig Discovered in the Abattoir." (5) "Intercostal Exostosis in the Pig." Our readers thoroughly appreciate the value of the literary work being done by Dr. Hughes, and are grateful for the energy and industry displayed by him in behalf of his profession.

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DR. DANIEL ELMER SALMON, Chief of the Federal Bureau of Animal Industry, was married on the 15th ult., in New York City, to Miss Agnes Christina Dewhurst. After December 1st the good Doctor and his bride will be at home to their friends at "The Iowa," Washington, D. C. The REVIEW extends its heartiest congratulations, and hopes they may long live to enjoy their new-found happiness.



## ORIGINAL ARTICLES.

## CLINICAL STUDY OF LAMENESS.

BY DR. CHENOT-ALGER.

*Translated from the German in the "Berliner Thierärztliche Wochenschrift," by DR. A. T. PETERS, Lincoln, Neb.*

The examination of a limb for the location of a lameness is a very important and often difficult one, and requires a thorough method and special observation. Aside from the macroscopic lesions (such as hypertrophy or deformities of the flexor tendons, the different traumatism, quarter-cracks, and toe cracks or galls) that are plainly visible to every one, we find numerous causes for lameness that can only be accurately diagnosed by palpation. This class of lameness, Dr. Chenot has given careful study. He warns first against the apprehension that if no visible cause is shown, the cause of lameness must be either in the hoof or in the shoulder; also the presence of visible lameness should not prevent one from making a careful examination, for it very often occurs that a hard or soft lesion (such as sidebones, hygroma, galls, etc.) may be suspected of

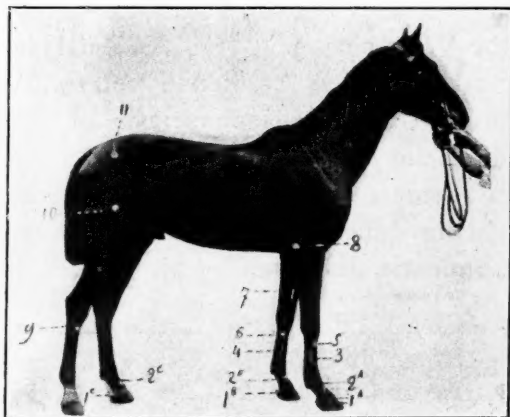


Fig. 1. General outline of the different painful points. 1a, 1b, 1c, Podotrochilitis. 2a, 2b, 2c, Pastern lameness. 3, 4, Sensitive zone of the Metacarpal Diaphysis. 5, 6, Pre-metacarpal pain. 7, Forearm lameness. 8, Elbow lameness. 9, Pre-metatarsal pain. 10, Femoral pain. 11, Gluteal pain.



Fig. 2. Examination of the Pastern Joint (Fore Limb).

causing the present lameness, which upon closer examination will be found not to be true.

The lamenesses with an invisible location, Chenot explains, are the sequel of chronic rheumatism, inasmuch as there is a general disturbance of the health of the animal, with acute emaciation (resulting from various cosmic, hygienic and other influences). The real seat is to be found in the aponeuroses, at the muscle insertions, in the bones themselves. That it is a question of rheumatism C. concludes from the various symptoms (lameness manifests itself during different stages), from the sometimes sudden, more oftentimes slow appearance after moderate as well as hard work, from the intermittence, from the frequent alternation of the affection from one limb to another. In order to diagnose correctly this lameness, it requires attentive manual examination, the palpation of the limbs.

Palpation is done either by pressure or pinching or shifting or stroking.

The pressure serves for examination of the muscle mass and of the deeper-lying parts. It is performed vertically or horizontally, often both are used together. (Examination of the bones, the shoulder and hip-joints, the patella, etc.)

Pinching serves for the superficial examination (the flexor tendons, tendons, fascias, and the aponeuroses), is performed by grasping the parts to be examined between the fingers. It allows one to ascertain the least changes from the normal conditions and also to ascertain the tender parts, the abnormalities of the tendons and of the ligaments, the temperature of the tissue, its consistency and retraction, its elasticity.

Palpation by means of shifting serves principally to ascertain the finer sensibilities. It is performed by moving the skin over the underlying tissue, and in this way the surfaces of the bones can be examined as well as the sensitive parts on the olecranon, on the fetlock, and on the borders of the articular surfaces.

Finally, palpation by stroking is principally indicated for nervous horses; it is performed by a gentle stroking of the parts

to be examined with the soft part of the fingers. The stroking allows the detection of the least subcutaneous elevations, the smallest exostoses, and the swellings of the periosteum that escape the keenest eye. Incipient neuroma, mild inflammations of the skin, swelling of the small lymphatics, can all be easily detected and their importance judged by this method.

Palpation is for the veterinary surgeon the only method to detect pain and study it clinically; by it, the extent of the sensitive zone can be accurately detected and the anatomical location of desmodynia, osteodynia, and myositis are determined, which, as manifestations of chronic rheumatism, are the results of lameness.

Aside from the hoof, an examination of which should always be one of the first things to take place, C. has found upon the limbs eleven different sensitive places, the palpation of which he indicates for the correct diagnosis of lameness.

#### A. THE FORE LIMB.

I. *Podotrochilitis*.—The fetlock may be the seat of two sensi-



Fig. 3. Examination of the Anterior Surface of the Fetlock (Fore Limb).



Fig. 4. Examination of the Metacarpus.

tive places the determination of which is very important.

The first, most often present, has its seat on the posterior surface, just above the heels, at the bottom of the transverse fossa of the pastern. It is an indication of either an inflammation of the coffin joint or a laceration of the strengthening sheath of the flexor of the coffin joint or that branch of the digital nerve distributed to the cushion of the frog.

C. considers this point as the pathognomonic symptom in the clinical diagnosis of "Podotrochilitis maladie naviculaire" (navicular disease), whatever the pathogenesis may be. The examination consists of vertically inserting the thumbs into the grooves of the pastern and exerting pressure with the pulp of the thumb; and the other fingers of both hands clasp the fetlock without and within and cross each other on the anterior surface; they serve as a brace.

If there is an inflammation of the coffin joint or its contiguous parts, the vertical pressure on such a small area, immediately over the heel, will serve to cause a pain, more or less pronounced according to the natural susceptibility of the patient to pain, and the thickness of the hand of the operator. This pain characterizes itself by a sudden contraction of the limb. This will not take place when the same test is made on the corresponding limb on which the animal does not show lameness.

The vertical pressure, combined with shifting, can assist materially in the diagnosis and prognosis which other methods do not offer. C. has, for example, with this method diagnosed the fracture of the navicular bone on a horse that was treated for two months, and thereby explained the impossibility of removing the lameness of this animal. On post-mortem the navicular bone was found fractured in the centre. It hung on the edge of the halfmoon-shaped surface of the *os pedis* and was held in place by a few more or less necrotic threads of the navicular ligaments; every fractured piece was highly ulcerated; the synovialis membrane was red, thickened, the synovia gray, red, and purulent. In another case known likewise as incurable, the autopsy showed a purulent inflammation of the coffin joint

besides two ulcerations of the articular cartilage of the navicular bone, with no other specific lesions in the different organs. On this particular horse, neurotomy had been performed without any results.

II. *Lameness of the Fetlock.*—The second sensitive seat is found in the fetlock, which often occasions severe lameness, the causes of which often elude many practitioners because almost all objective symptoms are missing. This second place has its seat on the anterior surface of the first digital phalanx below the fetlock joint, and somewhat inward from the inner border of the extensor muscles of the toe. To examine these parts and diagnose the sensitive parts, the hoof should be placed on a shoeing block, medium height; the forearm will be held in place by an assistant and the knee slightly bent. The assistant must, with the free hand, hold the metacarpus almost in a perpendicular position. The operator places himself in front of the limb, grasps the fetlock with both hands, the thumbs on top; the rest of the fingers cross or lay upon each other. With the soft parts of the thumb placed upon the toe, deep pressure is exerted in a



Fig. 5. Examination of the Flexor Tendon.

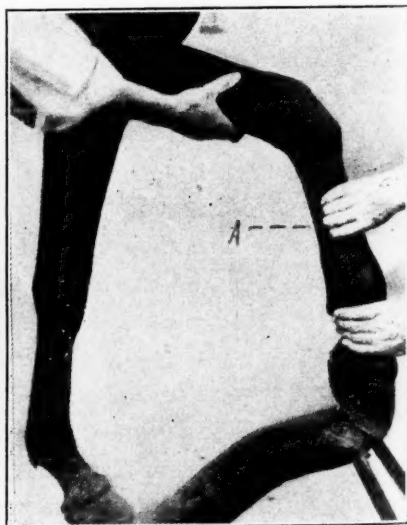


Fig. 6. Examination of the Sensitive Zone of the Diaphysis of the Metacarpus.



perpendicular manner over the axis of the fetlock. This pressure sometimes causes a very severe pain, so that the horse may bend itself and often resist the operation. When the same operation is performed on the other limb the animal will stand quiet. Often the pain is so intense that the animal may groan and on account of the palpation the lameness becomes much increased for some time. This lameness is frequent in France and has been described as fetlock lameness in 1870 by Abadie.

The sensitive point is not always in the same place; it is sometimes found to the right or to the left of the tendon, often at the middle of the anterior surface of the first phalanx; more often it has its seat above the reinforcement of the extensor of the toe on the inner surface of the tendon.

In some cases the diseased part has an extent of several centimetres. By comparing this part of the fetlock with the corresponding one of the opposite foot, one will often notice a somewhat pronounced difference. Without any marked swelling, the diseased part shows a slight elevation in contrast to the adjacent parts, while the same parts on the sound foot are more often concave. This difference is more pronounced when the pain has its seat on the inner side of the extensor of the toe, directly under the fetlock joint. Besides this light swelling we have a distinct elevation of temperature at this point which is confined to the elevated parts.

If the lameness is the result of a visceral infection, then the tendons and their enforcements take part in the inflammation. In the majority of the cases just described the tendon is absolutely intact, which can be easily ascertained in the case of thoroughbred horses and animals that have very fine skin and not thick, connective tissue. With animals that are easily handled, the tendon can be shifted with the thumb and index finger without causing pain, while the thumb of the other hand can be brought under the tendon and by vertical pressure and shifting more or less pain can be caused, which manifests itself through the contraction of the muscle of the shoulders and of the forearm, or by withdrawing the whole arm from the operator.

A second sensitive zone is found on the lateral surfaces of the first phalanx and is found through palpation (stroking combined with shifting) of the borders of the flexor tendon of the *os pedis*. This pain is caused by the inflammation of the nerve stumps after neurotomy.

III. *Osteodynia of the Metacarpus*.—This lameness manifests itself through no objective symptom. It occurs more often on limbs that appear to be free from every lesion. The examination occurs through vertical pressure by half bending the limb. The sensitive points have their seat on the posterior surface of the metacarpus underneath the carpal joint, on the upper end of the splint bones in front of the flexor tendon on both sides of the superior suspensory ligament of the fetlock joint. They exist either on the outer or on the inner surface of the splint bone or maybe on both.

To examine the outside of the left limb, the operator takes hold of the fetlock with the right hand, places the left hand over the suspected area of the metacarpus, the thumb pointed backwards on the head of the splint bone; the other fingers are flat on the anterior surface and on the outer border of the tibia.



Fig. 7. Examination of the Anterior Surface of the Metacarpus.



Fig. 8. Examination of the Elbow.

The pressure must follow in quick succession, with the flat portion of the thumb. The pain manifests itself through spasmodic contractions of the muscles of the shoulder and of the arm and forearm.

For the examination of the inner side of the knee the hand is changed and palpation is done with the right thumb. Almost always the pain is more pronounced on one side than on the other; therefore the hand that holds the fetlock should alternately extend and flex the toe. C. noticed that in thirty-three patients the outer osteodynia occurred twenty times. In thirteen cases it was only recorded on the inner side. In fifteen out of twenty-six cases osteodynia was recorded on both sides; pain was more pronounced on the outer side than on the inner. In almost all cases the shifting showed that the hand had retained its normal sensitiveness, that no subcutaneous pathological adhesions were present, and that the subcutaneous tissue showed no other lesions than the pain manifested. A number of times the pain was arrested by the use of cocaine and atropine, which was injected over the sensitive area and which gave relief from a quarter of an hour to three and one-half hours.

IV. *Non-hypertrophied*.—Laceration of the flexor tendon and of the superior suspensory ligaments of the sesamoid bones. The examination by pinching gives here the best results. The animal is retained in the above described position. The hand of the examiner next takes the flexor tendon of the *os coronæ* between the thumb and index finger, isolates it from the flexor of the *os pedis* and slides slowly from above downward with a slight pressure. This usually causes a jerking of the muscles of the limb when the tendon is in any way injured. Above the *os pisiform* the pinching is exerted with the whole hand, the thumb on the one side and the four fingers are used as support. This gives information as to the condition of the tendon sheath in its entire portion. The examination of the flexor tendon of the *os pedis* is accomplished the same as that of the flexor tendon of the *os olecranon*.

By pinching and shifting, one can with precision detect the

slightest alteration of the carpal ligaments, the tendons, the sheaths, and the superior ligament including its branches. To examine these branches the thumb may also be used in combination with shifting from above downward.

In horses with pronounced splints, the examination may be performed by placing the limb on a shoeing block, as described above. The examiner's hand is placed on the anterior surface of the tibia with the thumb on the posterior side. The thumb is glided slowly from above downward in the groove in front of the flexor tendons by the use of a number of thumb impressions. The eye of the operator must constantly watch the muscles of the arm and shoulder.

By means of this examination, C. diagnosed the different tenositis, tenalgia, tenosynovitis, and can by this method only, determine the extent and depth of the ruptures of ligaments and tendons, chiefly for prognostic value. Through stroking of the skin (it should be shaved when the hair is too thick) one can detect the cartilaginous enlargements of the tendon. Without this method of palpation one cannot recognize deep lacerations.



Fig. 9. Examination of the Pastern Joint (Hind Limb).

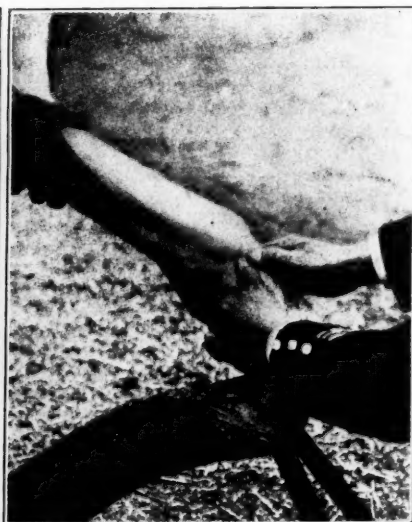


Fig. 10. Examination of the Anterior Surface of the Fetlock (Hind Limb).

Their early recognition is, however, important, for they are no longer wholly curable when deformation has set in.

V. *Pre-metacarpal Pain*.—The metacarpus can be a sensitive zone which may be more or less great, which is omitted in the ordinary examination because it only manifests itself through lameness. It has its seat on the upper epiphysis of the tibia on the edge of its outer border and the anterior surface at about the height of the point of insertion of the long lateral ligament. This osteodynia can be recognized through pressure of the suspected parts whereby the foot is flexed and placed on a shoeing block. If the lameness, on account of this pain, is of long standing and the animal has been again placed in service, one may notice on the suspected point a slight swelling, combined with local hyperthermia. C. has noticed that then the pain is much diminished. That the lameness has its seat here can be ascertained by a large local injection of cocaine. C. has, in a work published in 1886, demonstrated that the cocaine injection is only of value when applied over the sensitive area, while cocaine is useless when injected over a zone that is not sensitive.

VI. *Pain of the Diaphysis of the Radius*.—Lameness of the fore limb. Above the carpus sensitive zones are infrequent, and C. has only found them up till now on the inner side of the diaphysis of the radius and on the olecranon. The examination of the forearm is as follows:

1. On the standing limb; the four fingers closed, laid on the middle of the forearm; the thumb outward; thereby the extensor muscles are compressed.

2. On the half flexed limb, whereby the hoof is placed on a shoeing block similar to that of the examination of the anterior surface of the metacarpus. The pressure is exerted by the simultaneously contracted fingers, which glide from above to below from the upper third to the half of the forearm. The sensitive zone is from six to eight centimetres long and has its seat over the subcutaneous course of the median nerve. This lameness C. has seldom found in the horse, but often in the mule.



VII. *Elbow Lameness (Abadie)*.—The examination occurs on either standing limb; the right hand grasps the upper border of the elbow of the left foot, which, according to C., is most often affected, the thumb above, four fingers on the inner surface; the left hand flexes the limb by resting upon the anterior surface of the forearm. The pressure is performed with the thumb, in a perpendicular position, quick, light, but deep; the patient must not be surprised by the same. The sensitive zone is usually from two to three square centimetres in size. It has its seat between the elbow of the olecranon and the joint. The examination can be performed on a partly flexed limb. For examining the left elbow the right hand is used, the free hand clasps the fetlock, while the assistant supports the knee. The pain manifests itself through the sudden contraction of the elbow muscles at every impression of the finger.



Fig. 11. Examination of the Metatarsus.



Fig. 12. Examination of the Point of Emergence of the Gluteal Nerve.

#### B. THE EXAMINATION OF THE HIND LIMB.

The hind limb may also be the seat of painful zones which are identical with those just described in the foregoing paragraph.

I. *Podotrochilitis*.—The much less frequent podotrochilitis is determined the same as in the front limb, only the limb is held by an assistant, the same as in shoeing.

II. *Fetlock Lameness*.—Fetlock lameness is determined by placing the foot on a shoeing block; the pressure with the flat of both thumbs is exerted perpendicularly over the outer surface and sometimes from below upwards; the sensitive zone is somewhat more extensive than in the fore limb and lies somewhat nearer the pastern joint.

III. *Pre-metatarsal Pain*.—The sensitive point lies as in the front limb on the upper epiphysis on the boundary of the anterior surface, and of the outer border below the joint. The examination consists of placing the limb on a shoeing block.

IV. *Femoral Pain*.—An especially sensitive seat, which is peculiar to the hind limbs, although it may be looked upon as analogous to the forearm lameness, is found on the inner side of the thigh along the course of the saphenus nerve. It is determined by having the animal in a standing position. The flat of the index finger and the middle finger are used. The pain causes the instant lifting and withdrawal of the limb. The sensitive zone has a surface of one to two square centimetres.

V. *Gluteal Pain*.—A last sensitive point is manifest at the place where the gluteal nerve emerges on the croup. This pain is brought to evidence through the vertical pressure of the middle finger in the mass of the gluteal muscles. When pain exists, the whole limb drops under the pressure of the fingers.

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MANGE IN WILD HORSES.—So dangerous has become the disease of mange in Oregon among the wild horses that the wholesale destruction of these animals has been decided on. An immense corral will be built in the vicinity of Echo, Ore., and after the wild horses have been rounded up and driven into it they will be shot and their bodies burned.

## IMMUNIZATION : ITS FIELD AND LIMITATIONS.

BY JAMES LAW, DIRECTOR NEW YORK STATE VETERINARY COLLEGE,  
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Immunization as generally understood consists in the imparting of a systemic insusceptibility to a given microbial poison. This may depend on any one of several conditions or on a combination of two or more of such conditions.

1st. It may be mainly an acquired *tolerance* of which an endless number of familiar examples may be given. Exposure suddenly to the burning rays of a bright sun causes a violent erythematous inflammation, but after the same skin has become accustomed to this source of irritation, it no longer suffers but merely undergoes a process of pigmentation or tanning. A moderate dose of arsenic produces violent gastritis, with perhaps enteritis, diarrhœa, ophthalmia, or dermatitis, but after the arsenic habit has been acquired ten times this dose will produce no appreciable disorder. The boiler-maker accustomed to sleep under the noise of the factory, was affected with insomnia when removed to the country quiet and desired the lullaby of the resounding hammers that had become essential to soothe his mental organization.

2d. In a second class of cases, immunity may depend on the production in the system of a chemical antidote to the poison which has been introduced. This may find its counterpart in the antagonizing of the venom of the bee or snake, or the alkaloid morphia by potassium permanganate; in the more familiar neutralization of a caustic acid by an alkali; or in the rendering of pure carbolic acid harmless by the use of vinegar, alcohol, or oil of turpentine. In the system immunized from a contagious disease we look for an antitoxin or antibody of some kind which will neutralize the deadly toxin of the malady. The antidotal agents in such a case are the products of vital activity and such protective vital activity can only be carried

on in the living cells whether these be circulating in blood or lymph, or fixed in tissues as centres of nutrition, of absorption, of secretion, of nervous or other functions. We have here gone a step farther than simple *tolerance*, and yet the tolerance and the antidotal action may often operate together the one serving to corroborate the resistant action of the other.

3d. The production in the infected body of an agent antidotal toward the disease poison, introduces a new principle—the modification of the function of the living cell. The normal cell of the non-immunized body probably elaborates at all times a certain small amount of defensive material which tends to protect the system against the slighter microbial invasions, and it is only when the invasion comes in force that its power in this direction fails and the system falls under the shadow of the grave disorder. The issue may be said to depend on the relative force and endurance of the invading microbes on the one hand and the defensive body cells on the other. If the first predominate the issue is in death. If the second, the result may be a more or less perfect recovery. This very recovery probably implies a large measure of immunization. It may of course imply an inability of the invading microbes to survive any longer in the unwonted medium of the animal body, or their inability to any longer produce the same deadly character of poison or toxin. But in all cases in which the recovered animal shows a continued power of resistance and an indisposition to succumb to a similar dose, or to exposure to the infection, we may safely say that there has been produced a fair measure of immunity, and that this immunity is associated with a change in the vital processes carried on in the cells and the elaboration of antidotal products. In other words, the cells have been trained to produce more of the antitoxic materials. In many cases the cells once started in this new line of work go on producing the defensive materials for a length of time, and the duration of this acquired habit is the measure of the continuance of the immunity. After some infections the immunity is very transient, after others moderately long, and after others still it is enduring

perhaps for the lifetime. The difference depends largely on the force and permanence of the new habit impressed on the cells, and upon the continuance of this habit rests the value of the immunity.

In a simple abscess the pus microbes may fail to dominate over the adjacent body cells and tissues and with a free discharge a prompt and permanent recovery ensues. But there is no permanent immunity of the tissues that have been invaded, much less of those that are at a distance from the seat of the past invasion. Let there be an obstruction of the free issue of the pus and its production continues with the development of a chronic fistula. Let any special irritation be caused in the seat of the cicatrix and a new abscess develops with myriads of new pus microbes. Even when operating near the surface, as in footrot of cattle and sheep, these microbes show little disposition to give way, and so the disease continues indefinitely unless measures are taken which will ensure the destruction of the microbe. The acquired power of defence is so slight that it is scarcely at all recognizable.

In a second example, like foot-and-mouth disease, we find a distinct immunity established and a complete recovery ensues with an intolerance of the same microbes in the immediate future. When sores persist they depend on secondary infections by other microbes. But this acquired immunity is very transient and in three months after recovery a renewed exposure to the foot-and-mouth disease-infection may bring a second attack of that disease. Here we have a somewhat larger measure of immunity than in a simple abscess, but one that is still so weak and transient as to forbid any resort to it as a measure of prophylaxis looking toward the extinction of the affection in a locality.

We may find a third example in cowpox or sheeppox, from which any recovery is nearly as prompt as in foot-and-mouth disease, but it differs from that in being followed by an immunity of the entire system which lasts for years, or even for the entire subsequent lifetime.

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In our search for immunity from microbial diseases we must make a clear distinction between these different classes, and, if we hope for success, follow these leadings of nature as to which disease offers the best field for successful immunizing work and which for bid the expectation of an acquired satisfactory immunity.

A fourth element in the securing of immunity lies in what has been called the battle of the somatic cells and the invading microbes. This has been called phagocytosis, or literally, the eating of the invading microbes by the cells. It depends, however, very largely on the relative potency of the products elaborated by the two hosts of combatants, respectively. If the somatic cells and their antitoxins prevail, the microbes are poisoned by the leucomaines or antitoxins, debilitated or even disintegrated, dissolved by the cell enzymes and completely destroyed. Whole microbes, or disintegrated parts of microbes, are taken into or enveloped by the cell protoplasm, where they can be more readily saturated with the leucomaines and enzymes and speedily disposed of.

True, a converse action may go on along this line; the microbial toxins and enzymes may prove too potent for the somatic cells, which accordingly become weakened, disintegrated and destroyed by the violence of the attack, and their constituent parts become food for the invading enemies. The microbes may even invade the interior of the cell, as in the case of the piroplasma of Texas fever, and in place of losing vitality or potency, may grow and thrive, destroying the blood globules, and leading to profound pernicious anæmia and the passage by the urine of the liberated hæmoglobin.

For our present purpose it is needless to follow further the actions and interactions of the microbes and somatic cells, and of their respective toxins and digestive ferments. We have now before us a sufficient foundation for an intelligent consideration of the subjects of serum therapy and immunization on the lines that I wish to exploit.

#### *Serum Therapy.*

For serum therapy the essential conditions are that we *first*

secure an animal which is racially or congenitally insusceptible to the poisons produced by the microbes which cause the disease that we have in hand ; or, *second*, as an alternative, take a susceptible animal and by small non-lethal doses of the microbe and its toxins, produce in it an acquired immunity, and by repeating the process indefinitely, raise that immunity to the highest possible grade. Then take the blood-serum of the highly immunized animal and inject the same, subcutum, into the animal suffering from the disease, or inoculated therewith, and as yet in the stage of incubation. In this way the antitoxins and other defensive products are availed of where they can act as direct antidotes, or antagonists, to the invading microbes and their products. In serum therapy we avail of the antitoxins, ready made, in place of stimulating their production in the infected system. In many cases they can be used to excellent purpose in saving the life of the animal injected. The system is, however, subject to its drawbacks and limitations.

1st. It is transient in its effects. By resort to this method we have not stimulated the somatic cells to the production in increased amount of the defensive products in the body of the animal infected, and, as the antidotal agent introduced will remain but a short time in the system without chemical change or elimination, its favorable operation is therefore limited to that temporary presence. Like a dose of morphia, which will check a violent pain or spasm, it is good while it lasts, but it does not by its own action prevent the resumption of the evil processes the moment it has been used up or eliminated. Thus, to secure a satisfactory result, we must continue the use of the serum so long as the living microbes remain in the system ready to produce more of their deadly toxins. In suitable cases we can in this way obtain a cure, but, if we stop short, we shall have only held the disease-process in abeyance for a time, to rise again with new force when the serum has been eliminated. This must be qualified by two considerations :

a. If the animal furnishing the serum is of the same species with the animal receiving it, and if leucocytes from the first

subject and suspended in the serum are introduced into the second, these may survive and continue in the new animal system the production of the antitoxin in which they were engaged before they were transferred. In this way a certain, though very limited measure of protection may be permanently obtained from subjecting an animal to serum therapy.

b. If the immunized animal from which the serum is taken, has been subjected to a corroborative infecting injection or inoculation shortly before it furnished the serum, it is quite possible that some of the microbes, may, up to the time of operation, have escaped destruction and may pass in the serum into the system of the animal operated on. If that animal is specially susceptible, or if the microbes introduced are very potent they may in themselves produce a fatal infection, or seriously intensify the infection already present. If less numerous or potent, or if the system into which they are introduced has large powers of resistance they may only temporarily survive in the new habitat, yet long enough to educate the cells of the animal treated to produce a protective measure of defensive bodies.

2d. There is always the danger of error as between two diseases which resemble each other, so that the serum from a case of one disease, or from the animal immune to it, being mistakenly used for the other, it will fail to produce the desired curative effect. Errors in the attempt to differentiate anthrax and black-quarter, anthrax and malignant œdema, swine plague and hog cholera, etc., are liable to cause frequent failures of this kind, which will throw undeserved discredit on serum therapy.

3d. The condition of the patient's system, or in which it lives, may effectually counteract the operation of serum therapy. Thus the black-quarter germ, in presence of lactic acid, or in the new born, will proceed to a deadly issue in spite of the application of serum therapy. The germ of rabies which has grown for generations in the rabbit, will reduce the incubation in the inoculated animal to one-half the usual time, and make the fatal result correspondingly more certain.

4th. Serum therapy will fail when the toxin has already

become united chemically with the constituent parts of a vital organ from which it cannot be dislodged and where the association is too strong to allow of chemical antidotal action. Tetanus offers a striking instance of this. When the antitoxin has been mixed with the virulent matter before inoculation, or when it is given in large doses just after inoculation it is effectual in preventing the disease, but when the toxin has already reached the brain matter, and entered into combination with it, so as to cause active tetanic manifestations it will then require from 150 to 2000 times the amount of antitoxin to produce the same effect, and in too many cases even the use of such excessive doses fails to moderate the spasms or obviate a fatal result.

5th. Serum therapy is always open to the objection that in order to obtain the immunizing serum, we must keep up an uninterrupted series of cases of the infecting disease, and that there is therefore always a risk of the escape of the germ, through insects or other channels, to contaminate other animals. It is therefore always attended by a measure of risk of accidental extension of the disease. While it can often be largely and beneficially availed of in lessening the mortality from an infectious disease, it cannot be held up as the best resort, when the object is the complete extinction of the infection in a given locality or country.

#### *Immunization by the Use of Toxins.*

As we have already seen, a permanent immunization is conferred, if at all, by the introduction into the system, of the animal to be protected, of the microbe or the poisons which it elaborates, so that the animal system becomes accustomed to the action of these poisons, and exerts an increasing effort to neutralize or destroy them. This the system accomplishes through the increased production of antitoxins, enzymes, and perhaps other protective bodies. But to stimulate to the production of these protective bodies, the somatic cells must be subjected to the action of the poisons elaborated by the microbe. In other words, the patient must be passed through a mild, non-fatal form of the disease from which immunity is sought. In

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some cases this can be effected by the introduction of the toxins alone, in sterilized solution, but in others, and as usually carried out, it consists in the introduction of the infecting microbe itself in a less virulent or less potent form; or in a part of the body less favorable to its proliferation (blood, less-vascular part), or finally in an extremely minute dose (1 or 2 microbes), which can be early and almost certainly destroyed by the leucocytes.

It is true that temporary immunization can be secured, in certain cases, by other methods, as when the fox fed on a purely carnivorous diet is relatively immune from anthrax, or when by a free use of alkalies the tendency to tetanus, or black-quarter can be kept in check. But such immunity only lasts so long as the animal fluids are kept charged with the products of the meat diet or with the alkaline medicine, and is lost so soon as these are eliminated by the natural emunctories. Immunization as now conducted consists in a protection of reasonable duration, or for life, brought about by the production, from the somatic cells, of certain constituents which neutralize the disease-poisons.

#### *Vaccination and Variola.*

One of the earliest methods of immunization was achieved by variolization in man, mild cases of smallpox being produced by the direct inoculation from a discreet case. Later the Jennerian vaccination completely superseded this, and proved an almost ideal method, since the inoculation of a disease which was almost harmless to man protected him from one which was then generally diffused and very deadly. In our more modern immunizations, however, there is scarcely a single counterpart in which the mild has excluded the deadly disease. Other immunizations are therefore not entitled to be put in the same category, and arguments deduced from vaccination must be received with due qualification.

#### *Fundamental Conditions of Immunization.*

The basal conditions, that would favor immunization, are mainly as follows:

1st. The fact that the affection does not occur a second time in the same subject.



2d. The fact that the malady follows an acute course and is succeeded by a complete recovery.

3d. The fact that the disorder is a very deadly or injurious one when it occurs by ordinary infection.

4th. The fact that the animals are placed in conditions favorable to safety during the process of immunization and where no other animals are endangered by the process.

5th. The fact that immunization can be conducted more economically than the complete extinction of the germ by other methods.

*Affection Does Not Recur in the Same Subject.*

Immunization is impossible in case of a disease which recurs under renewed infection shortly after recovery from a first attack. This is what excludes from available diseases, the foot-and-mouth disease of mammals. As contra-distinguished from this affection may be named as promising diseases, sheeppox, rinderpest, lung plague, strangles, anthrax, black-quarter, contagious pneumonia, and rabies. These are all acute diseases, run a rapid course, make a reasonably complete recovery, and are not followed by a second attack. So far as these prerequisites control therefore, they are promising diseases for immunization, by any method which will subject the system to their toxins without danger to life.

*Does Not Subside Into a Chronic Disease.*

Infectious diseases which assume a chronic type, and run for an indefinite length of time are to this extent unfit for immunization. If the system were to become antagonistic to the microbial poison to such an extent as to successfully resist a new invasion, that system would necessarily destroy the microbes which are already present in the body and cut the disease short instead of allowing it to continue in a chronic form. It is for this reason that tuberculosis, glanders, dourine and contagious footrot are unsuitable subjects for immunization. In the chronic cases of these diseases the system is constantly under the stimulus of those toxins which rouse the somatic cells to produce the defensive products, but these fail to bring about the

intolerance or resistance which would prevent the continued existence in the tissues of the invading microbe, or the extension of the territory invaded. I submit, therefore, that all the attempts made by sanitarians, from Koch onward, to secure immunization by products of the tubercle bacillus, are work in an unpromising field. Local skin tubercle, when uncomplicated by deeper disease centres, may, under the use of tuberculin, slough off the diseased mass and make a good recovery, but the same is not to be expected in case of deep-seated tubercle. There may be an arrest of progress, with improvement of the general health, and a failure to any longer respond to the tuberculin test, and yet under unwholesome conditions, the smouldering disease takes on its former activity and the animal runs down to a hopeless condition.

If you ask me if some cases do not recover I answer yes, just as some recover without treatment by tuberculin, tuberculocidin, the debris of comminuted bacilli, or other product of the microbe, and as horses recover under treatment by mallein and without such treatment; but this does not prove that the recovery in either disease is due to the action of the microbe or the microbial product. In both diseases alike the more violent cases go on to a fatal result in spite of all treatment, while in the mild cases that recover there is unquestionably present in the system a strong inherent resistance to the disease, and it is impossible to ascertain how much the recovery is due to this systemic intolerance and antagonism, and how much to other conditions like a good regimen, an open air life, a tonic treatment, and the influence of the microbial products. The same holds true in the case of man; of the inhabitants of cities one-third suffer from tuberculosis yet only one-seventh or one-eighth die of tuberculosis. The recoveries are much more likely to take place in connection with specially good hygienic conditions and especially an open air life than from mere tonic treatment or dosing with the microbial products. As veterinary sanitarians we are confronted, not by the question of the relative number of lives preserved, as by the progress made toward the ex-

tinction of the infection in the herd and district. The sanitarian of man faces a moral question, and if he can be credited with saving a cherished human life he will be extolled to the skies and loaded with honoraria as his reward. But with our patients it is largely a question of economics, and if the preservation of our patient is to be the cause of the subsequent infection of a number of others, and of the perpetuation of the infection in the herd and district, to say nothing of the danger to man, then I submit that we have failed in the first object of our mission. The continuance of the disease, indefinitely, in a herd, will, in the long run, lead to far greater financial loss, than would its extinction at the cost of the highest priced of animals at the beginning.

The same principle applies to the other methods of treatment, tonic and hygienic. Open air life, generous feeding, and tonic medication are all of high value, alike in tuberculosis and glanders, and should never be omitted when treatment is resorted to, but as no one of these measures, nor all of them combined, can assure us of a complete recovery, and as they constantly fail in cases that lie on the border line of resistance or on the wrong side of it, it follows that the infection must be perpetuated under any such treatment. If then, the deadly infection is to be kept up in a herd, and if it is to be extended generation after generation to other herds, will we be acting in the line of duty in following a method by which such perpetuation is determined, even if we can set up against such endless perpetuation of the infecting microbe, the preservation or even the recovery of some tens, or scores or hundreds of individuals? Let us glance merely at the economics of the question, as given in this table :

Milch Cows in U. S.	Value.	Loss at 5%.	Loss in Dollars.
16,292,360	\$514,812,106	81,461	\$2,574,167 at \$31.60
Other Cattle.			
27,610,054	689,486,260	139,050	3,447,108 at \$24.97
Total . . . . .			\$6,021,276

Estimating the average lifetime of steers at three years and

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of cows at eight years, this gives an average age for both of 4.8 years. If we count the loss from perpetuation of tuberculosis in our herds at 5 per cent. per generation instead of per annum, it would still mean \$1,254,411 a year. If to this we were to add the cost of segregation and treatment of the infected, the loss would be more than doubled. I submit then, the question: Is it economical, is it sound sanitation, is it good statesmanship, which would adopt a method which will tax our animal industry \$2,500,000 a year for all future time, rather than one that would aim at the extinction of the infection and the abolition of this tax for ever? We cannot tell what the future may have in store for us, and we cannot affirm that it is impossible that a better and entirely successful method of immunization from tubercle can be developed, but in view of the lack of immunization in the old chronic cases which have continued for years, the conclusion seems unavoidable that the hope of success does not lie along the lines that are now being followed. Until a better hope can be entertained, from research along new lines, it seems far more rational to conduct the work of extinction of the disease by the old established methods, which have never failed us when applied vigilantly, under skilled intelligence, and according to the dictates of science. Experimental investigation is one thing—this should be allowed a free hand along the lines of highest promise, as indicated by the pathology of the disease—but administrative measures for the suppression of the affection are altogether different; these are entirely unwarranted unless it can be demonstrated that they will be effectual. The outlay of public money for ineffective work, or for work that gives no hope of success, is a misappropriation of public funds, and ought not to be tolerated.

As with tuberculosis, so with glanders: both follow a chronic course, neither in such cases produces a reliable measure of immunity, and thus in both alike the saving of individuals by serum or toxin treatment, must always be attended by cases of preservation of the infection in a latent form and the propagation and maintenance of the infection.

As opposed to tuberculosis and glanders, which are so often chronic and even occult, acute and deadly diseases such as rinderpest and lung plague offer themselves as in that respect well adapted to immunization. These affections run a rapid course and often kill their victim, but in those that recover there is a relatively very strong immunity, which forbids them subsiding into a chronic form, and transmitting the disease by microbes still operating in the system. Lung plague, it is true, is often followed by sequestra in the lungs, but in these the vitality of the microbes is early exhausted, and in all my inoculations from such sequestra upon susceptible animals, I have had a uniform failure. Rinderpest is much shorter in its course and gives rise to no such abiding sequestra, so that after recovery the interior of the body is quickly divested of microbes and the exterior and surroundings have alone to be cared for. This has been extensively availed of in the Philippines, where the insular and therefore secluded arrangement is further favorable to success. The attenuated virus prepared at Manila, is inoculated on all the cattle or carabao on an island, or in a carefully secluded district, and in a couple of weeks all the cattle have been satisfactorily immunized, and may safely be allowed to enter infected buildings or herds. But unless conducted with the greatest care this might easily become a means of deadly extension of the infection. If applied on wide unfenced ranges where herd mingled with herd, or upon herds in which parturitions were going on, it could only lead to deadly extensions and serious losses. Again it can only be carried through by the maintenance, at some point, of an infected herd in process of immunization, and thus there is the constant danger of the escape of the infection from such herd, through birds, vermin and other channels to infect new born and other susceptible animals.

Before leaving this class I should notice a group of microbial affections in which the animals acquire a tolerance of the microbe, yet continue to harbor it to a limited extent, yet in a form that is deadly to other animals when transferred to them. We have no better example of this than Texas fever. After the

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first violence of the infection has subsided and the animal appears to have completely recovered, the piroplasma continues for a length of time in the blood, and may be transferred to other susceptible animals, if its normal intermediate bearer (*Boöphilus annulatus*) is present. The same remark applies to the various trypanosomiasis, and probably to the horse sickness of Southern Africa, so that none of these diseases give good hope for a successful immunization by the usual methods.

*The Disease is Very Deadly or Injurious.*

It is for the very deadly or injurious affections that the cost of immunization is warranted. If a disease does little injury the cost of prevention may be greater than that of a general diffusion of the malady. Economy must decide in each case what measure must be adopted.

*Environment Must be Favorable to Immunization.*

Immunization against rinderpest in the Philippines has been already referred to. But the same method would not prove equally effective on the unfenced Steppes of Eastern Russia or Siberia. Indeed, inoculations have been carried on there for a length of time, but the plague prevails as before. The same may be said of cattle lung plague. Immunization by inoculation in the tail has long been practised in Europe, and if attended and followed by suitable disinfection, and in the absence of birth of new, susceptible animals, it can be availed of to extinguish the infection in buildings and well fenced enclosures. But, in the fenceless ranges of Central Europe, and above all, on the Steppes of Russia, the plains of India and China, and the open pasturages of Australia and South Africa, it becomes rather a means of perpetuating the disease. It protects the individual inoculated, but it spreads the infection among the unprotected animals.

This subject might be enlarged upon in its relation to other diseases, but it rests essentially on this principle, that in order to immunize animals with safety to others, they must be completely separated from each other and from persons, places and things that might become intermediaries in the conveyance of

infection. Each disease demands its own special precautions, so do the conditions of a varied environment, and the special adaptations of sanitary measures can only be made by a mind fully versed in the whole pathology of the malady, open to all the bearings of the environment, and keenly alive to the vital question of economics involved.

*Economics of Immunization.*

This is the first and most important question in dealing with immunization, and it may well be referred to as being the last court of appeal. In its bearing on certain affections there is no difficulty in reaching a decision.

Take *anthrax* as an example. The bottom lands of a great waterway have become infected through the prevalence of the disease higher up, or from the infected products of factories on the stream, so that no herbivora can be placed upon such lands without subjecting them to the greatest risk. It is impossible to drain these lands so as to render them wholesome, and it is highly expedient that they should be devoted to the support of live stock. Here the only rational resort is immunization. Without it, ruinous losses are inevitable. With it losses from anthrax are abolished or reduced to a minimal and negligible quantity.

But this can never excuse the reckless anthrax inoculation on other and anthrax-free soils, or in anthrax-free buildings, of animals that are to be turned out on the infected fields. If these fields are suited to the preservation and perpetuation of anthrax germs, this becomes a means of planting the germ there and thereby extending the area of the prevalence of anthrax. It is true that the animals inoculated are protected, but at a ruinous expense, as this territory newly infected with anthrax is an absolute extension of the anthrax-area, and no animals can henceforth be safely turned on this soil until they, too, have been inoculated. Under such an uneconomic and vicious system, how long will it be until all the lands favorable to the preservation of the *Bacillus anthracis* shall be infected with it? And this is done in the name of sanitation and economy.

In the same class with anthrax may be placed black-quarter, tetanus, septicæmia hæmorrhagica, and malignant œdema. All are preserved in favorable soils and each is liable to be extended in area, or intensified in a previously infected field, by the occurrence of fresh cases, whether casually or as the result of protective inoculation.

Take an example of a different kind. For many years since Pasteur's splendid demonstration of the arrest and defeat of the germ of rabies, by the daily injection of graduated doses of weakened virus, increasing in strength day by day, it has been a favorite resort in Paris, where it has even been proposed to immunize in this way all dogs, and thereby extinguishing the contagion from lack of susceptible material. The practical result, however, is that in Paris rabies continues as prevalent as ever, while across the Channel, by impartial and universal muzzling, England has made a complete end of the infection, and proposes to maintain this by the quarantine of all imported dogs, which are to be kept under close supervision for six months after their arrival. The economy and efficiency of the simple, common sense method of England, is in marked contrast with the elaborate, careful, expensive, and scientifically accurate, but comparatively ineffective system resorted to in France.

Take still another example. In the United States we have in round numbers 50,000,000 swine, of which we lose some millions yearly from hog cholera and swine plague. We have in the market a number of methods of alleged immunization and serum therapy, and the owners of some of these specifics back up their claims by an offer to pay for all the hogs that die after taking their course of treatment. This has a plausible appearance of fairness and self confidence, and a large number of swine breeders are tempted to bank on the method. But when we look at the plain facts of the case, the fallacy becomes apparent. When an infected herd is taken in hand the most susceptible are already dead, or will die before they have time to take the full course of treatment, and as the less susceptible will then die in smaller and smaller numbers, so that there is a delusive

appearance of success, those that die after the full course will be comparatively few, and those who exploit the protective measures can well afford to pay for these out of the gross income obtained from the rest of the herd. In the second place, the greatest fatality is always among the young pigs, which are of comparatively little value, so that indemnity for these is no great drain, and the payment for the survivors first of the young, and second of the older and more refractory animals, makes a safe and abundant fund to draw from. Then there is the additional fact that even in bad hog cholera seasons the losses may be \$20,000,000, representing at \$6 a head but a little over 3,000,000 pigs, and leaving 45,000,000 free. Say that our speculators could secure 10,000,000 of our 50,000,000 swine to operate on, they would in the most plague-stricken years meet with only 600,000 deaths, and, as most of these would perish before the course of treatment could be taken, it would leave but a very insignificant number for which they would be called on to pay. Another consideration is that any well considered toxin or antitoxin treatment does reduce sensibly the number of victims, as I found a quarter of a century ago, but the survivors are often undesirable animals, with broken constitutions, and are unprofitable as stock, growing or fattening animals. Up to the present time it has not been shown that any such protective system is an unqualified success when used on a sufficiently wide range of subjects to fully test it, and as all such treatment tends to extend the area of disease by the preservation of infected herds and the diffusion of infection, they cannot be accepted as truly economical resorts.

In conclusion, it may be said that while in certain diseases under favorable conditions immunization may be resorted to with great advantage, yet under other conditions, in other infectious diseases, and, above all, as a measure of general application it is far from being the most desirable resort. To apply it effectively it must be controlled and directed by the best and soundest professional judgment, and it should be abandoned whenever it is possible, by simpler and less expensive measures,

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to completely eradicate the infection from the country. It is at best a partial and temporary good, and must be held as far inferior to the more radical methods which will finally extirpate the infection of animal diseases from the civilized earth. I have long held that the sanitary intelligence and advancement of a people is to be estimated by their readiness to extirpate infection, and I look confidently forward to the period when all the deadly contagia of animals and men will be only a matter of history. I shall not live to see this, perhaps none of us will, but just so sure as the opening of the 20th century so prodigiously excels that of the 19th in technical and sanitary matters, so will the time come when the plague-free herds and peoples will cause the thoughtful to stand in amazement that the needless pestilences were so long allowed to blight the world, and that the light of civilization and knowledge did not sooner draw earnest attention to the ruinous bane and its obvious remedy.

**BLOODED HORSE RESENTS INSULT.**—*Orange, N. J., Nov. 9.*—Blue Boy, a fine pacer owned by John P. Kernan, a well known horseman of South Orange, yesterday resented an insult offered by John Beach, colored, and as a result Beach is laid up for repairs. The man was cleaning the horse, and while doing so amused himself by spitting in the horse's face. The animal stood this once or twice, but at last retaliated by reaching forward and biting Beach on the lip, lacerating it severely.

**HORSE HIS FIRST CUSTOMER.**—Tony Milano, a sixteen-year-old Italian, of 204 Hester Street, started up in business as a pushcart pedler yesterday. He has been a thrifty bootblack for several years and he invested all his coin in a pushcart and a load of apples. At the corner of Canal and Mercer Streets a horse attached to an express wagon, driven by William McGarvin, ate up most of his apples. Tony with a slab of wood about three feet long was forcibly persuading the animal of the error of its ways when B. Hollander, an official of the Corn Exchange Bank, happened along and had Tony arrested for cruelty to animals. What few apples were left in Tony's cart were scattered about the street by the enraged driver and the pushcart was irretrievably wrecked. Tony's temper was not improved when Magistrate Cornell held him in \$300 bail for further examination.—(*N. Y. Sun, Nov. 5, 1904.*)



## VACCINATION AGAINST TUBERCULOSIS.

A REVIEW OF THE ATTEMPTS TO IMMUNIZE CATTLE AGAINST TUBERCULOSIS.

BY D. ARTHUR HUGHES, Ph. D., D. V. M., CORNELL UNIVERSITY, GOVERNMENT INSPECTOR, EAST ST. LOUIS.

Perhaps there is no one phase of thought which has greater infatuation for the student of the pathology of infectious diseases to-day than that of the question of immunization. From the day when Jenner discovered the principle of vaccination up to the present there has been a greater and greater turn of scientific thought towards the subject, until now, for the bio-chemist as well as for the pathologist, it is, as I have said, an infatuation. The wonder is that it is not even more studied; for, complex as are the problems involved in the investigation of means and methods of immunization against diseases widespread in their destructiveness, that there is a possibility of prevention at all might well have led to more ardor in the study of pathologic toxins and antitoxins. What has been done is much,—but little (to use an Irishism). In human medicine the discovery of an anti-diphtheritic serum (we are pleased to think manufactured from equine serum), the vaccine preventing mortality in small pox, seem to be the main advances made in the study of anti-toxic inoculation against infections. The difficulty seems to be that the work in the laboratory is fraught with perplexities arising from the danger of handling the disease bacteriologically, as well as made more knotty by the specialists' knowledge of bio-chemistry which the investigator should have. The chemistry of the organic products known as the toxins and antitoxins of infectious diseases are at present little understood. Moreover, the specialists' knowledge of bio-chemistry together with a specialist's knowledge of the bacteriology of definite etiologic factors causing the bio-chemic conditions is seldom had by a single investigator. Yet it seems likely

that the discovery of the antitoxins producing immunity could be carried on, most successful experimentation conducted and definite results could easiest be obtained by men in which this fuller knowledge was happily combined.

Nevertheless, as in human medicine so also in veterinary medicine, the principle of inoculating with attenuated but living virus propounded by Jenner was investigated by experimentation on small animals by Pasteur in rabies and the same principle has been carried into our field. In lung plague, in emphysematous anthrax, in Texas fever, if not in anthrax also, this method of setting up an organic immunity by producing a local disease similar in kind to the destructive infection causes the formation of an antitoxin resident in the body sufficient in itself to be protective. Though the bio-chemic changes in the serum are yet unknown; though the new conditions formed in the serum to produce immunity against a definite kind of pathogenetic microorganism eludes us, we are rightly elate over the established principle that sometimes a temporary, at other times, it seems, a permanent immunity can be produced. Furthermore the method, successful as it has been in several cattle plagues, will in all likelihood be at least tried in many of the infections: for it is possible that particular antitoxins, chemical, organic protective fluids evolved by the body, may act as agencies against the toxins of other specific diseases, besides those already studied, which induce these poisons. The manufacture of various kinds of tuberculin by Koch, and those who have followed his directions, represents still another laboratory formulation of a toxin. In this case the toxin did not, as was at first believed by Koch, to the joy of the scientific world, prove a remedy against the disease. Its therapeutic value was exploded. Still tuberculin proved a positive detector of the disease in all cases, including the more subtle, lurking, unknown forms—even in the inactive, latent forms of the disease which the Germans call passive tuberculosis. Indeed it is in this disease, *par excellence*, that the greatest interest at once of the bio-chemist as well as of the pathologist, must be centred.

Carrying away, as it does, by various estimates, one third to one seventh of the human race; and infecting destructively 20, 40, and even in some cases 60 per cent. of imported breeding stock,<sup>1</sup> it is certain that investigations looking towards a possible immunization of cattle against this disease will be sure to have an interest to veterinarians, cattle dealers, and the general public, as well as possibly eventually have a practical value in the diminution of the infection.

The number of milch cows in the United States on Jan. 1, 1904, from Federal statistics,<sup>2</sup> the latest available, was 17,419,817; the number of "other cattle" 43,629,315, a grand total of 61,049,315. "Fortunately," says Dr. Salmon, "our meat-producing animals are to-day the freest from tuberculosis of any highly-bred stock which enters the markets of the world."<sup>3</sup> It is well known from tuberculin tests of European cattle that in some countries twenty per cent. and in other countries as high as fifty or sixty per cent. of the cattle are infected with the disease. In America we have reason to believe the case is not quite so bad. Still the disease is rampant here and has been widely propagated largely by the introduction for breeding purposes of infected animals from Europe. The war against bovine tuberculosis here has been begun by the State and Federal governments and the central authorities have taken steps to prevent further importation of the disease from Europe.

"Some of the States and various municipalities are making tuberculin tests and slaughtering the cattle which they find diseased."<sup>4</sup> "The length to which the States have gone in the fight against bovine tuberculosis is detailed in an important monograph from the hand of Dr. Salmon: Legislation with reference to Bovine Tuberculosis being a digest of the laws now in force and a transcript of the laws, rules and regulations and

<sup>1</sup> Dr. Salmon, "The tuberculin test of imported cattle." P. 9. Bulletin No. 32, U. S. Dept. of Agri. B. A. I. 171.

<sup>2</sup> Year book of the Dept. of Agriculture, 1903. P. 663.

<sup>3</sup> "Tuberculin test of imported cattle." P. 9. Bulletin No. 32, U. S. Dept. of Agri.

<sup>4</sup> *Supra cito*. P. 8. Bulletin 32, U. S. Dept. of Agri.

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proclamations for the several States and territories."<sup>1</sup> While the Bureau of Animal Industry now has inspectors in foreign parts to test with tuberculin all cattle destined for exportation to the United States. No tuberculous cattle henceforth can be shipped to America.

In other words the use of the single bacterial product, tuberculin, has proven of practical value in veterinary medicine in three ways. 1. Not only is it an infallible spokesman of the presence of tuberculosis when a reaction occurs, but, 2, it is of commanding value on the economic and commercial side: for its use upon cattle which are to go into the export trade prevents the importation afresh of the disease and ensures tubercle-free cattle for breeding purposes, while in our herds its use helps us to discover and stamp out the infection. But it is passing strange how many scientific discoveries are made by accident. Behold the very positiveness of the diagnosis by tuberculin's aid has *per accidens* taught us, 3, that in many cases cattle not responding or not reacting to the tuberculin test not only do not have tuberculosis, but may have either a temporary or permanent immunity. Notwithstanding the fact that many cattle have been continuously and for a long time exposed to the disease in a tuberculous herd they do not react to the test and must be declared non-tuberculous. Of course we are not speaking here of highly tuberculous animals, which, it is notorious, sometimes do not react because their serum or lymph seems to be charged with tubercle toxins and antitoxins; rather to those which are undoubtedly free from the disease under the test and it seems must be declared to possess either a temporary or permanent immunity. Just here is where the rub lies. Has the term immunity here been properly applied? Is it not possible, as in other infections, that such animals have contracted the disease, that the disease has become localized (at the same time not noxious) and segregated, that the antitoxin has been developed in the blood or lymph streams and that the animal is consequently immune? We know from post-mortem inspection

<sup>1</sup> Bulletin No. 28, B. A. I. 157, U. S. Dept. of Agri.

in the abattoirs that immensely large, fat, old pigs may have a localized and seemingly isolated and innocuous tuberculosis in the submaxillary, retro-pharyngeal or cervical lymphatics while the carcass is free from tuberculosis, and in such cases, by the government's orders, such carcasses may be passed while the head is condemned. In cattle likewise, but not so commonly, a localized, old, segregated tuberculosis may be found while the carcass is otherwise tubercle-free. Yet, if the cattle in the tuberculous herds referred to, that seemingly do not have tuberculosis, have minute, isolated lesions of what may be called a past tuberculosis, or of a passive (inactive) tuberculosis, is it not true that from such points there may spring up again an active tuberculosis to menace and eventually destroy the animal? Tuberculin has proven to be, and it undoubtedly is, in the vast majority of cases, an infallible diagnostic agent, even detecting the smallest lesions of the disease. But are we sure that cattle, negative to the tuberculin test, are always absolutely free from bovine tuberculosis? Too great certainty, dogmatism in science, is scientific anomaly; and scientific dogmatists (who are monstrosities in the scientific world) often have their faith rudely shaken. Should we not be on our guard against a too hasty declaration when we express a belief that cattle which do not react are "immune" to the disease?

Nevertheless, basing their judgment upon the tuberculin test, and applying the term immune to cattle in a tuberculous herd, or not (?), which under the most careful use of the agent do not react, in America, Germany, and even in Italy, in the case of Maragliano, investigations are being carried on to discover if there is a possibility of vaccination—using the term in a wide sense—against bovine tuberculosis.

#### THE ATTEMPT TO IMMUNIZE CATTLE AGAINST TUBERCULOSIS.

##### 1. In America.

(a) *Work of de Schweinitz and Schroeder.*

The Chiefs of the Pathological and Bio-Chemic Divisions of the Bureau of Animal Industry, Department of Agriculture, in Washington, working in conjunction with the Chief of the

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Bureau, have ever been vigilant in the investigation and discussion of important questions relating to infectious destruction to domestic animals. Accordingly after Koch's statements in the summer of 1901 on tuberculosis, there came out under the imprint of the Departments, in rapid succession, such valuable monographs as: 1. "Relation of Bovine Tuberculosis to the Public Health," Dr. Salmon<sup>1</sup>; 2, "Virulence of the Bovine Tuberculosis Bacillus for Monkeys and the Effect of Tuberculins made from Tubercle Bacilli derived from Different Animals," Drs. de Schweinitz and Schroeder<sup>2</sup>; 3, "The Infectiousness of Milk of Cows which have Reacted to the Tuberculin Test," Dr. Mohler<sup>3</sup>; 4, "The Milk Supply of Two Hundred Cities and Towns," Alford and Pearson<sup>4</sup>.

Questions like these, which had been engaging the public thought, involved the other question of immunity. On the question of the immunity of cattle exposed to bovine tuberculosis, therefore, Dr. de Schweinitz had been working from as early as 1894. In the *Medical News* for Dec. 8th of that year, he showed that guinea-pigs, inoculated with an attenuated but living tubercle virus of human origin—the bacilli carried on in glycerin broth to the twentieth generation—then inoculated with bovine tuberculosis, did not succumb to the latter disease though ordinarily guinea-pigs are easily infected by bovine tuberculosis. Further, de Schweinitz and Schroeder showed that a cow inoculated intravenously with a small amount of the same attenuated culture of human origin, did not die. Still further, the same investigators tried the same virus in large intravenous inoculations upon cattle—500 c.c. of a liquid suspension—without a virulent tuberculosis being set up in the cattle<sup>5</sup>.

<sup>1</sup> Bulletin No. 33. B. A. I.

<sup>2</sup> 18th Annual Report Bureau of Animal Industry, 1901.

<sup>3</sup> Bulletin No. 44, U. S. Dept. of Agri., B. A. I.

<sup>4</sup> Bulletin No. 46, U. S. Dept. of Agri., B. A. I.

<sup>5</sup> Vid. Pearson and Gilliland. *Jour. Comp. Med. and Vet. Archives*, Nov., 1902. Also Bulletin B. A. I., Dept. of Agri., Nov. 13, 1896.

Similar experiments to test the immunization of cattle against a natural exposure to bovine tuberculosis are being continued by de Schweinitz and Schroeder at Washington. They report, in the *AMERICAN VETERINARY REVIEW* for Jan., 1904, the result of one of their latest experiments on the subject. A cow, negative to the tuberculin test, was, in 1902, injected into the jugular vein five times, July 19, Aug. 6, Aug. 20, Sept 25, and Oct. 7, each time with 10 c.c. of a human culture of the 59th to 62d generation, which they believed not to be longer virulent for cattle. On Jan. 27th, 1903, after another negative test with tuberculin, the animal was placed in a stall with tuberculous animals, together with others for control. Post-mortem of the animal by Dr. Schroeder on Jan. 30, 1903, revealed the entire lung sprinkled with minute white nodules of a tuberculosis of human origin, proven by inoculation of guinea-pigs from the nodules, without lesions in other parts of the body. The controls, though healthy when exposed with the above animal to the bovine infection, all contracted bovine tuberculosis from the exposure. The conclusions of these experiments are: 1, the animal treated with the human germ was apparently resistant to the bovine disease, while the human germ was apparently persistent in its system; 2, highly bred animals for breeding purposes might be immunized to advantage by this method, nevertheless; 3, the practicability of the method for animals to be used for food and milk is questionable, because it is impossible to state how long the human bacilli may remain alive and therefore be infective for bovines.<sup>1</sup>

(b) *Work of the Live Stock Board of Pennsylvania.*

Under the wise direction of Dr. Leonard Pearson, whose firmness has led to the large control of bovine tuberculosis in the State of Pennsylvania and has made him noted there and

<sup>1</sup> Since writing the above I have read in the *AMERICAN VETERINARY REVIEW* for Nov., 1904, of the untimely death of Dr. de Schweinitz. Possessing, as he did, the specialist's knowledge alike of bacteriology and bio-chemistry he was able to touch the basal sources of changes in the organism due to infections—a knowledge deplorably absent in many who are attempting to unravel the double skein of bacteriology and bio-chemistry. In his life he added lustre to his Department; and after his death his fame continues and will remain.

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<sup>1</sup> Nov.

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throughout the land, whose discretion and diagnostic ability was desired by the Federal authorities in the outbreak of foot-and-mouth disease in New England, whose value as a consultation veterinarian, as well as an investigator in infections, the University of Pennsylvania, the State of Pennsylvania, the Federal authorities and veterinarians at large well know—under Dr. Pearson's direction the question of immunization of cattle against tuberculosis is being investigated. The work has been under way for at least eight years and is still being continued.

Drs. Pearson and Gilliland, the latter assistant bacteriologist of the Live Stock Board of Penn., have reported their results and conclusions, reached so far, in a concise paper printed in the *Journal of Comparative Medicine and Veterinary Archives*.<sup>1</sup> In 1901 they attempted to determine, first, the influence of Koch's original tuberculin upon the resistance of cattle to tuberculosis, and concluded from experiment with four cows that subcutaneous injections of the toxin of the tubercle bacilli had some influence in increasing the resistance of two of the cows to a feeding tuberculosis.<sup>2</sup> Second, they determined from numerous experiments that the sputum of persons suffering from consumption and cultures of tubercle bacilli made from such sputum are usually comparatively non-virulent for cattle.<sup>3</sup> Third, it was observed that a given culture of sputum tubercle bacilli is incapable of producing serious disease in such quantities as it may be necessary to use in an attempt to increase an animal's resistance to tuberculosis, indeed their injections of enormous quantities of tubercle bacilli from human sputum into the blood beneath the skin of bovines, into the peritoneal cavity or into the lungs showed that in these cases cattle were refractory to the disease and, like de Schweinitz, they believe that these injections of human tubercle bacilli increase the resistance to cultures of bovine origin.<sup>4</sup> Fourth,

<sup>1</sup> Nov., 1902.

<sup>2</sup> Supra cito. Pp. 2 and 3.

<sup>3</sup> Supra cito. P. 5.

<sup>4</sup> Pp. 6 and 9.

their repeated injections, intravenously, of large quantities of tubercle bacilli of human origin into young cattle and their findings led them to conclude that these injections increased the resistance of these cattle to virulent tubercle bacilli of bovine origin. The intravenous injections of human bacilli may be increased to such an extent that young cattle are not injured by inoculation with quantities of such cultures that are capable of causing death or extensive infection of cattle not similarly protected.<sup>1</sup>

For the past two years the work of experiment and observation on the broad question of a practical vaccination against bovine tuberculosis has been continued in Philadelphia. Dr. S. H. Gilliland, in place of Dr. Pearson, read a provisional report at the St. Louis meeting of the A. V. M. A. of the work on this question of immunity being done by the Penn. Live Stock Sanitary Board. Their Board is to print a full account of their experiments conducted during the last two years, either this winter or during the early spring. Doubtless it will be as important a monograph as the previous publication of the Board.<sup>2</sup> Dr. Pearson was in Europe during the past summer, studying, we believe, the work of Maragliano on the question. The lines in which the investigators in Philadelphia are pursuing their experiments are indicated in Pearson and Gilliland's previous publication. They wish to determine: 1, the duration of a possible immunity; 2, its effect in protecting cattle against a natural infection; 3, what quantity of a non-virulent tubercle culture can produce a serviceable immunity.<sup>3</sup>

## 2. *In Europe: Germany; Great Britain.*

### A. *Germany.*

Because Geheimrath Professor B. von Behring of the University of Marburg, Germany, has become renowned throughout Europe and the world by reason of his investigations on the

<sup>1</sup> P. 11.

<sup>2</sup> Tuberculosis in cattle and the Penn. plan for its repression—Pearson and Gilliland, L. S. S. B. bulletin No. 75.

<sup>3</sup> *Supra cito.* P. 12.

question of vaccination of cattle against tuberculosis, because he won the Nobel prize at Stockholm in 1902 for his speech in which he disclosed his discoveries in the immunization of cattle—which was believed to be one of the most important revelations in veterinary medicine in modern times, and because, for the same reason, he was made a count by the German emperor, it would be well for me to write *in extenso* upon his whole procedure, I shall therefore give an exposition of the subject and explain: 1, his definition of immunization; 2, his method; 3, his aim; 4, his results; 5, his conclusions; 6, recent trial of his method in Germany.

(a) *Von Behring's definition of immunization.*

As there is nothing more fallacious than to decry a man's work without understanding his point of view, it is well to remember von Behring's definition of immunization. He prefers to use the word "Jennerization" rather than immunization, alike to render tribute to the discoverer of vaccination against small-pox, Dr. Jenner, as well as to enforce his meaning. "Jennerization," he says, is the protection of an individual against infection through intentional inoculation of a modification of the same virus which produces the disease against which protection is sought—of a modification which by proper application is harmless to the individual we choose to protect. The central word of his definition is, of course, the word "protection," the interpretation of which is that Jennerization is an endeavor to raise the resistance of an individual, either temporarily or permanently, against an infection by inoculation with the modified virus mentioned. With that caution characteristic of the Germans, von Behring is careful to say that in his studies of Jennerization of cattle against tuberculosis he does not pretend at the present time to have found an absolutely harmless tuberculous virus for inoculating young cattle. In his researches at Marburg he tried to find a modified virus for inoculating purposes by working on pure cultures of tubercle bacilli derived from human sources, on cultures originally taken



from an avian tuberculosis, and finally on a culture of tuberculosis of bovine origin which was reduced in virulency by treatment with trichloride of iodine. Like de Schweinitz and Pearson, he found that human tubercle bacilli are reduced in virulence after having been grown on artificial media for a long time. Accordingly in his Jennerization experiments he invariably employed this kind of attenuated virus.<sup>1</sup>

(b) *His method; kind of material used; how put up; dosages.*

This particular kind of attenuated virus is put in order in uniform dosages for protective inoculations. Von Behring differs from others in that he prepares his toxins in the dry state. For protective inoculation the virus consists of attenuated but living tubercle bacilli, we repeat, of human origin the state and effect of which has been examined thoroughly in the Institute for Experimental Therapy in Marburg. When kept in sealed glass tubes even for a period of thirty days, these bacilli remain unimpaired in their action on cattle and can be used for immunization within that time. Each tube furnished by the Institute contains an exactly weighed quantity of tubercle bacilli—100 milligrams, or twenty-five doses of four milligrams each.

When tubes are to be used the method is as follows: The whole content of a tube is pulverized into a mortar in the dry state and then rubbed into a homogeneous emulsion by gradual addition of 2 to 3 cub. c.m. of a boiled and subsequently cooled 1 per cent. salt solution. This emulsion is then poured into a graduated cylinder of 50 c.c. capacity, care being taken that every part of it is washed out of the mortar by rinsing repeatedly with the salt solution until the cylinder contains exactly 40 c.c. The contents of the cylinder are now transferred to a sterile wide-mouthed flask holding 100 c.c., and ten more cub. c.m. of the salt solution are used for rinsing the cylinder and are added to the 40 c.c. in the flask which now holds 50 c.c. of the virus ready for injection, of which 2 c.c. represents the proper dose for the first inoculation, provided that the tube con-

<sup>1</sup> For von Behring's definition, etc., see his article in *The Journal of Tuberculosis*, Jan., 1903. Karl von Ruck, editor, Asheville, N. C.

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tains 25 doses or 100 milligrams.<sup>1</sup> The virus having been prepared, either in the above manner or else on fresh serum, the remainder is easy: 1, operate on young bovines, from five to seven months old, which have not reacted to tuberculin; 2, give them by intravenous injection a first dose of 0.001 gram. of a culture on serum from four to six weeks old; 3, four weeks later make a second intravenous injection with a dose twenty-five times stronger 0.0025 gram. of the same culture.<sup>2</sup> There are two methods, therefore, protect inoculation with what were dry bacilli emulcified as stated, protective inoculation with a fresh serum culture.

(c) *His aim.*

Professor von Behring's aim is to greatly heighten the resistance of young cattle, if not permanently immunize them, to bovine tuberculosis. It is his present belief that young cattle up to six months of age can receive a successful protective inoculation, *although already tuberculous*, provided they do not already show any other symptoms of tuberculosis except a high degree of susceptibility to tuberculin.<sup>3</sup> The protective inoculations with dry tubercle bacilli and with fresh serum cultures have at present (Sept., 1902) been performed in such numbers that we need entertain no serious apprehensions of doing harm. In more than one hundred cattle, aged three to twelve months, thus inoculated no harmful consequences have been observed. In a village near Marburg, Wehada, two such animals were slaughtered several months after the protective inoculations and they were found to be in an excellent state of nutrition and free from tuberculosis. His aim has been to establish the harmlessness of the method on the one hand, and on the other hand to vindicate his opinion that the inoculation with a virus of human origin will superinduce an immunity to tuberculosis of bovine origin.

<sup>1</sup> Supra cito, *Jour. of Tub.*, Jan., 1903.

<sup>2</sup> Beiträge Zur Experimentellen Therapie, Oct., 1902.

<sup>3</sup> See *Jour. of Tub.*, Jan., 1903.

*(d) His results.*

If the question be asked in what manner do cattle, which have previously been treated with a protective inoculation, respond when infected with bovine virus, he would answer. With the increased resistance to infection by the inoculation of virus formed from dried tubercle bacilli there is developed a like resistance to infection with bovine virus. This he hopes eventually to establish beyond reasonable scientific doubt. The results of his investigations show not only: 1, that the inoculated animals are immune to an experimental (inoculated) bovine tuberculosis; but, 2, that those inoculated with human tuberculosis remain protected against a bovine tuberculosis of natural origin; that is to say, they are free from tuberculosis when exposed in an infected herd of cattle.

*(e) His conclusions.*

Enthusiastic over the question as von Behring is, he believes his experience warrants: 1, that his method should be tried with the economic purpose of attempting to suppress, or at least to restrict, bovine tuberculosis; 2, though he is convinced of the positiveness of its value in the restriction of the disease he wishes to inquire into the temporal quality or permanency of the immunity and to test the method widely in Germany and elsewhere.

*(f) Recent trial of his method in Germany.*

Melde<sup>1</sup> is testing the truth of von Behring's statements by the inoculation of cattle in Marburg, Kirchheim and Frankenburg. Altogether he has inoculated one hundred and twenty-five cattle in Kirchheim and Frankenburg, time he believes will be necessary to test the validity of the methods. He desires to test: 1, whether by von Behring's method immunized cattle withstand the natural tuberculous infection; 2, for what length of time immunized cattle are protected against a tuberculous infection; 3, whether two inoculations suffice to confer upon the animals a constant immunity; 4, in what way and

<sup>1</sup> Vid. *Berliner Thierarzt. Wochenschrift*, Dec., 1902.

with what financial sacrifice can the immunization of cattle be applied in practice.

*B. Great Britain.*

We hear much, when scientific speculation is under discussion, of the faculty called scientific imagination. The value of the speculations of this particular faculty of the human mind, whatever it is defined to be, is usually based upon the quantity and variety of experience, experimental, observational or otherwise which the man has who possesses it. In science this faculty is largely possessed only by men who belong to the first order in discovery. Professor John McFadyean, Principal of the Royal Veterinary College, London, long known as a profound student of tuberculosis, and lately famous as a scientific controversialist, in 1902, and since, has been investigating the question of immunization of cattle against tuberculosis. His long experience in scientific investigation and his undoubted leadership in scientific scholarship, make his thought on the question of immunization of value, even though as yet it is comparatively in the speculative stage and has not fully taken the form of conclusions tallying with many experiments in inoculation. He has conducted some experiments chiefly to test the remedial and immunizing value of tuberculin in bovine tuberculosis.

The questions for which he is attempting to find solutions are: Do all individuals of the common breeds of European cattle share in the susceptibility which appears to be an attribute of the species regarded as a whole, or do any of them possess such natural powers of resistance to infection as would entitle them to be called immune? . . . . Some individuals escape the disease. . . . Do these fortunate individuals owe their escape to powers of resistance above the average—in other words to a practically useful degree of immunity or to the fact that in spite of the apparent uniformity of the conditions, they have had to offer resistance to a smaller quantity of infective material than the animals of the same herd that contracted the disease? . . . . Do individuals of the bovine species acquire immunity as the

result of recovery from a first attack of tuberculosis, whether contracted naturally or induced experimentally? Tuberculosis has frequently been cited as a disease in which no immunity is conferred by a first attack. Clinical observations of human beings are alleged to support the statement that such persons have successive attacks of the disease. . . . The abeyance is only a retrogression of lesions. At any rate the only evidence that would be at all convincing in such cases would be that furnished by the application of the tuberculin test to the supposed convalescent, or by a careful post-mortem examination of all his organs. During recent years the application of the tuberculin test to animals of the bovine species has, in some instances, appeared to point to the complete recovery of some individuals; but, as far as the writer (McFadyean) is aware, no reliable evidence of the re-infection of such animals has been placed on record, nor has evidence of complete resistance to such infection, after apparent recovery, been sought for experimentally.<sup>1</sup>

Professor McFadyean recounts, also, his observations in experiments conducted on cattle which had naturally a high resistance to bovine tuberculosis. He, like the Americans and the Germans, inoculated intravenously such cattle, negative to tuberculin, with attenuated but living virus from human origin and has concluded: 1, whatever may have been the degree of natural immunity, it was increased by successive intravenous inoculations to which they were subjected; 2, the immunity was not absolute but it may be doubted whether a degree of resistance that would meet that term is obtainable by any method in cattle.<sup>2</sup> Furthermore in his report to the Royal Agricultural Society on his experiments, differing here from von Behring who stoutly maintains the practicability of inoculation against bovine tuberculosis, McFadyean observes: it is not pre-

<sup>1</sup> Vid. *Jour. Comp. Path. and Therapeutics*, Vol. XVI, P. 136.

Also—*Jour. Comp. Path. and Therapeutics*, Vol. XV. Part I. Pp. 60-71.

<sup>2</sup> *Jour. of Comp. Path. and Therapeutics*, Vol. XVI., Pt. 1, Pp. 60-71, March, 1902.



tended that the experiments foreshadow a practical method of vaccinating cattle on a large scale against tuberculosis; but it is something to have established that animals of that species can have a very high degree of immunity against the disease conferred on them.<sup>1</sup>

If we should winnow away from their writings, statements proceeding from superabundance of zeal (well enough in its place) on the part of observers and experimenters in immunization against bovine tuberculosis and attempt to calmly sort out what is known from what is unknown we must set in order, categorically, the facts as follows.

It is now known :

1. That certain cattle in many communities or regions, irrespective, seemingly, of breed or environment, either because of a natural or acquired resistance are, when tuberculin tests are made upon them, temporarily, and barely possibly permanently, immune to bovine tuberculosis under a natural exposure.
2. Intravenous injections of attenuated but living virus of human origin (the bacilli in which have been grown for many generations on laboratory media) raise the resistance of cattle, negative to tuberculin, and thought not to be tuberculous. The protection furnished is against the infection by bovine tuberculosis by a natural exposure.

It has not been determined :

1. Whether the immunity, if such it can be called, is evanescent and temporary, or whether it is permanent.
2. Whether the protection acquired by the methods at present employed has such a serviceable duration as will make it of economic importance.
3. What the duration of the protection is.
4. Whether it is possible by any procedure to bring about a "serviceable" immunity, or a "useful" immunity, *i. e.*

<sup>1</sup> Vid., same Jour., Mch., 1902.

an immunity which will be of practical value in animal industries and commerce.

These, indeed, seem to be the only phases of the subject which at present have captivation for the scientific mind. The endeavor is to obtain some method of immunization which will be of sufficient value to be employed in the restriction and diminution of the disease among cattle: its suppression is an ulterior question. If that can be done it would be a great boon and similar methods would be employed in tuberculosis among other animals. Light seems to be breaking in upon our darkness. The enlightenment may have for us as radical changes in its wake as the discoveries of Jenner and Pasteur had in human medicine. We hope it will.

A "HOME" FOR HORSES.—A young Massachusetts woman, who inherited a large sum of money, has started, near the village of Stowe, some twenty-five miles out of Boston, a home for horses. The place is called Red Acre Farm, and on it are to be seen all kinds of old, worn-out and crippled horses, from the thoroughbred to draught type. The farm was opened in May, 1903. The horses are taken there, given treatment if necessary, and after a long rest and good care many turn out to be "creditable to the farm." Afterwards these are returned to careful owners, fitted to bear life's burdens, but not until they are entirely rehabilitated are they allowed to be taken from the place. The farm is the only one of its kind in America, and is sheltering hundreds of horses which need care and kindness.

EGYPTIAN CATTLE PLAGUE.—Lortet wishes the French government to take immediate cognizance of the present cattle plague, the Khedive having addressed him on the subject. He seems to find some connection between this plague and the cholera of 1903, which killed 100,000 people; with the bubonic plague of the same year, which claimed 800 victims; with the epidemic of trypanosomiasis in 1904, which killed 400,000 negroes; and with the chicken cholera of this year, which practically destroyed all the domestic fowl of lower and middle Egypt. The Boers tried immunizing injections of the bile of infected animals, which either saved other animals or apparently killed them instantly. Serums have been tried so far without result, but Lortet advises the study of the pyrosomes found in the red corpuscles of infected cattle.—(*Lyon Medical*, May 15.)

## THE EFFECT OF MOLASSES FEEDING ON HORSES AT REST.

BY P. A. FISH AND A. M. SEAMAN, ITHACA, N. Y.

Presented to the 14th Annual Meeting of the New York State Veterinary Medical Society, at Brooklyn, Sept. 13-15, 1904.

The use of molasses as a food for stock was suggested by Hermstadt, as early as 1811. In Europe it has been used as a stock food for a number of years. In some countries it has been subject to taxation, and its cost, therefore, has been an important factor in determining its general use. In Austria-Hungary during 1900-1901, six per cent., and in Germany 27.6 per cent. of the total product of molasses was used for feeding purposes. It has been fed largely to cattle with the idea of improving the quality of the beef and in some cases of increasing the milk production. It was found that when molasses was used, the hay and grain might be diminished and that it rendered food of a poorer quality more palatable. It was fed in quantities ranging from 5 to 12 ½ pounds per day.

Some experiments in molasses feeding were carried on by Dr. Griffin in Porto Rico from 1898 to 1901. Thirty-five pounds of grass and 13 to 15 pounds of molasses were used as a daily ration. When beginning the new ration there was an average loss of 27 pounds in weight. This loss, however, was soon made up and the animals gained over the original weight. He found that the horses did more work and presented a better appearance as a result of the molasses feed and the cost of their maintenance was reduced from 27 cents to 15 cents per day.

Dr. Liautard, of Paris, reports, concerning molasses peat, that there is no danger nor inconvenience in its use; that the general condition, muscular power, energy to work and the health of the animal remained perfect. The coat presenting a better and more glossy appearance. That when subject to colic and indigestion, the attacks are less severe, less frequent and sometimes disappear.

In 1902 Berns experimented with molasses upon two unthrifty horses weighing 900 and 940 pounds respectively, feed-

ing one quart of molasses diluted with three quarts of water three times a day with some grain and hay. There was no constipation nor indigestion. In six weeks horse No. 1 had gained 175 pounds and No. 2, 146 pounds. A number of truck horses were also experimented with. All improved in condition; the general health was excellent, acute indigestion and spasmodic colic were rare, although they had been frequent before the experiment.

The Colonial Sugar Co. of Fiji, Australia, also report experiments with molasses. They fed at one time as much as 30 pounds per day, but believing this too high they reduced the amount to 15 pounds per day as a steady diet, given along with 3 pounds of bran and 4 pounds of corn with as many green cane tops as the animal could eat. Some constipation had been noticed and the bran was given to correct it. They concluded that an albuminoid ratio as low (wide) as 1 : 11.8 is suitable for heavy continuous work. (1.13 pounds of digestible albuminoid, 13.30 pounds of carbohydrates including 0.24 pounds fat=1 : 11.8). Such ration they believe to be suitable in a tropical climate. No undue fattening, softness nor injury to wind was observed.

Grandeau's experiments showed sugar to possess a coefficient of digestibility amounting to 100, *i. e.*, all the sugar was digested, none being found in the droppings. The thirst was not increased, in fact, it was a fraction less than when sugar was not used. Other experimentors also report quite uniformly favorable results.

As a result of the testimony in numerous reports the following conclusions seem warranted :

Good molasses is a highly nutritive food, easily digested, and assimilated, and in some cases at least corrects faulty digestion.

One quart of molasses at 3 cents will take the place of three to four quarts of good oats at  $4\frac{1}{2}$  to 6 cents.

The sudden change from dry oats to molasses mixed with other food stuffs is safe and causes no marked disturbance of the digestive organs.

Molasses fed horses will do as much or more work and remain as a rule in much better general condition.

The cost of feeding, depending upon locality, may be reduced from 25 per cent. to 33 per cent. In some localities there is no reduction. In general, molasses may be considered as a product containing sugar that cannot be crystallized by any known method. Its composition is to a certain extent variable and the following would perhaps represent an average analysis:

Water . . . . .	20 per cent
Dry substances containing:	
Nitrogenous substances. . . . .	10 "
Sugar. . . . .	50 "
Non-nitrogenous . . . . .	10 "
Salts. . . . .	10 "

Molasses contains from 1 per cent. to 1.5 per cent. of nitrogen, sometimes more. It is reported that sugar molasses possesses greater activity than sugar alone. Its nourishing value is high and it is easily assimilated. Being soluble, it requires but little digestive action and in this way there is some saving of the vital energy of the organism. Molasses or sugar is readily diffusible, the osmotic processes are rapid and the passage through the intestinal tube into the circulation is not prolonged. Because the osmotic action is rapid, it is doubtful if there is complete oxidation of the sugar. Assuming that the blood is not able to supply sufficient oxygen for complete transformation, there probably results a stored up energy for subsequent tissue and fat formation. Kellner found molasses to be four times as valuable for flesh production as ripe wheat straw. Meat from molasses-fed cattle has been pronounced of first class quality.

As compared with sugar, starch must undergo considerable modification and various changes before it can undergo assimilation.

Up to the present, there has been no record of toxic effects from molasses feeding. Occasionally diarrhoea has been reported, presumably due to the salts in the molasses; on the other hand some have reported constipation, which has usually been corrected by the addition of a little bran to the feed.



Some untoward effects and inconveniences incident to the use of molasses have been reported. It has been believed by some that molasses tends to cause miscarriage in pregnant cows and that in young animals it appears to have a tendency to cause softening of the bones, unless calcium phosphate be added to the diet.

As examples of inconvenience may be mentioned the smearing of the manger and parts of the stall, the body of the animal, clothing, stable implements, and serving to attract the flies in warm seasons. In summer there is some danger of fermentation and the bursting of the barrel. As a result of fermentation there is loss of sugar, practically rendering the molasses unfit for use. With a good grade of molasses, the keeping qualities are good, and there is not much danger of fermentation. It should contain not over 20 to 22 per cent. of water. If there is 25 per cent. of water there is danger of change.

#### EXPERIMENTS.

Experiments in molasses feeding were conducted upon three horses at the New York State Veterinary College. No. 1 was under observation from Dec. 21, 1903, to April 2, 1904. No. 2, from Jan. 18 to Feb. 4, 1904. No. 3, from Feb. 5 to April 18, 1904. These animals were brought to the college to be disposed of. They were all well along in years, and were not therefore in the best of condition.

They were under observation for a week before the experiments began, in order to determine as well as possible, their normal conditions. After the experiments were concluded, the observations were still continued, upon two of them, for a week or more longer. A total of eighty examinations of the urine were made, and the body weight was taken at regular intervals throughout the whole period of observation. No. 1 was a mare badly affected with the heaves, but otherwise was apparently in very good condition. Her age was estimated at 12 years. Her weight, the evening the experiment was begun, was 892 pounds. She was kept in her stall throughout the experiment and re-

ceived no exercise further than a walk to the scales three times a week, a distance of about one-eighth of a mile.

Beginning Dec. 21, her urine was examined daily up to Dec.

25. The average of these determinations is shown in the following table:

Specific gravity . . . . .	1.041	
Solids . . . . .	95.53	per 1000
Chlorides . . . . .	13.449	"
Sulphates . . . . .	2.25	"
Phosphates . . . . .	0.8375	"
Urea . . . . .	35.25	"
Albumin . . . . .	Absent	
Sugar . . . . .	"	

The formula recommended by Dr. Berns was used in a modified form. Corn meal being omitted and some oats substituted. Because the mare was doing no work she was put on half rations. For the month previous to the experiment she had been getting about 1.5 pints of oats; 2.5 quarts bran, and 6 pounds of wet hay twice daily.

On the evening of Dec. 24th, she was put on the following ration:

Molasses . . . . .	1	pt.
Water . . . . .	3	pts.
Cut hay . . . . .	2.5	lbs.
Oats . . . . .	1	lb.
Coarse bran . . . . .	2	qts.

The hay, oats and bran were mixed first and then the diluted molasses slowly added and mixed thoroughly. This was refused at first, but the feed was all gone the next morning. After three or four days she ate the mixture readily. She was fed morning and night.

On Dec. 28th her weight was 878 pounds, showing a loss of 14 pounds since the 24th. As she ate her bedding and seemed hungry, it was thought best in connection with her loss of weight, to increase the ration to the following amount:

Molasses . . . . .	1	qt.
Water . . . . .	3	qts.
Cut hay . . . . .	5	lbs.
Oats . . . . .	1	pt.
Bran . . . . .	2	qts.

The average of two urinary examinations taken since the

24th, and the period of increased ration gave the following results :

Specific gravity . . . . .	1.031
Solids . . . . .	73.395 per 1000
Chlorides . . . . .	8.089 "
Sulphates . . . . .	1.5 "
Phosphates . . . . .	1.08 "
Urea . . . . .	20. "
Sugar . . . . .	Absent
Albumin . . . . .	"

Comparing the two tables, there is found to be a loss in all of the solids except the phosphates, which are increased.

In spite of the increased ration the weight of the animal continued to decrease, and she did not regain her weight of Dec. 28th until Jan. 12th. She had been weighed seven times in the interval, and the average of these weights was found to be 865.39 pounds. Seven urinary determinations were also made during this period. The average of these is as follows :

Specific gravity . . . . .	1.0434
Solids . . . . .	98.85 per 1000
Chlorides . . . . .	15.80 "
Sulphates . . . . .	1.85 "
Phosphates . . . . .	2. "
Urea . . . . .	13.14 "
Albumin . . . . .	Absent
Sugar . . . . .	Present

On Dec. 30th, a trace of sugar was noticed in the urine. This increased somewhat in amount later and averaged about 0.33 per cent. to 0.42 per cent. A comparison with the other urinary tables shows that during this period of decreased weight there was an increased amount of solid constituents in the urine, except urea, which had fallen to nearly one-third of the amount found in the normal urine. The sulphates are also somewhat lower than found in the normal, but higher than in table No. 2.

During the next period from Jan. 12th to Jan. 25th the animal was weighed seven times, and the average of these weights amounted to 872.9 pounds, a gain over the preceding period, but still about 20 pounds less than the normal weight. Six urinary examinations were made during this period with the following results :

Solids . . . . .	91.258	per 1000
Specific gravity . . . . .	1.0391	
Chlorides . . . . .	11.571	"
Sulphates . . . . .	2.08	"
Phosphates . . . . .	1.98	"
Urea . . . . .	13.08	"
Albumin . . . . .	Present	
Sugar . . . . .	"	

With a slight increase in weight there is a corresponding decrease in the urinary solids, except in the case of the sulphates. On Jan. 18th the presence of albumin was noted. It was also present on Jan. 20th and Jan. 22d, but had disappeared by Jan. 25th.

On Jan. 25th there was added to the ration 4 oz. of dried blood from which the serum had been previously removed. The addition of the blood did not lessen the animal's eagerness for the food. No further change was made in the diet until Feb. 8th. During this period the animal was weighed five times and the average weight was 883.6 pounds. A gain of 10.5 pounds over the preceding period. Five urinary examinations were also made with the following results:

Specific gravity . . . . .	1.0402	
Solids . . . . .	93.666	per 1000
Chlorides . . . . .		
Sulphates . . . . .	0.8	"
Phosphates . . . . .	1.27	"
Urea . . . . .	14.2	"
Albumin . . . . .	Absent	
Sugar . . . . .	Present	

Owing to an error the chlorides were not correctly reported, and they are therefore omitted. In spite of the increased albumin in the diet there was no appearance of it in the urine, although the sugar persisted.

On Feb. 8th the diet was again changed by reducing the amount of molasses to 1 pint for each ration until Feb. 15th. The horse was weighed four times during this period, and the average weight obtained was 885.7 pounds, showing a gradual gain. Four urinary examinations were also made, with the following average:

Specific gravity . . . . .	1.1043
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Solids . . . . .	105.19	per 1000
Chlorides . . . . .		
Sulphates . . . . .	Trace	
Phosphates . . . . .	1.13	"
Urea . . . . .	23.	"
Albumin . . . . .	Absent	
Sugar . . . . .	Present	

The gain in urea is noticeable. In the urine of Feb. 13th it was found that the sugar had disappeared, probably on account of the lessened amount in the ration.

From Feb. 15th to Feb. 22d no molasses was fed. The ration consisted of:

Bran. . . . .	3 qts.
Oats. . . . .	1 pt.
Long hay . . . . .	6 lbs.

This was fed morning and night. The horse was weighed three times in this period and gave the average weight of 889.1 pounds. Three urinary examinations were made with the following average:

Specific gravity . . . . .	1.038	
Solids . . . . .	85.54	per 1000
Chlorides . . . . .	4.967	"
Sulphates . . . . .	Trace	
Phosphates . . . . .	0.60	"
Urea . . . . .	39.3	"
Albumin . . . . .	Absent	
Sugar . . . . .	Trace	

The gain in urea and decrease in phosphates is very noticeable. Although the animal was receiving no molasses a trace of sugar during the middle of this period and persisted. On Feb. 22d she was given a pint of molasses diluted with water, sprinkled over her hay. On Feb. 25th her weight was 896 pounds. A gain of 6.9 pounds over the previous period or a gain of 4 pounds over her original and normal weight at the beginning of the experiment Dec. 24th. Urinary examinations were made Feb. 25th and Feb. 27th with the following average:

Specific gravity . . . . .	1.040	
Solids . . . . .	93.20	per 1000
Chlorides . . . . .	4.362	"
Sulphates . . . . .	Trace	
Phosphates . . . . .	0.75	"
Albumin . . . . .	Absent	
Sugar . . . . .	Present	



On Feb. 27th the experiment was discontinued, but the animal was kept under observation until April 2d. During this period she was weighed 12 times and an average weight of 861.8 pounds was obtained. Eleven urinary examinations were made and these averaged as follows :

Specific gravity. . . . .	1.0426	
Solids . . . . .	99.34	per 1000
Chlorides . . . . .	3.998	"
Sulphates. . . . .	Trace	
Phosphates. . . . .	1.25	"
Urea. . . . .	32.9	"

Traces of sugar appeared Mar. 1st and Mar. 5th. Traces of albumin also appeared Mar. 12th and Mar. 17th. No positive tests for these substances were obtained at any other time during this period.

The condition of the animal through the molasses period was excellent ; her coat presented a fine appearance and her general health was good. There was no evidence of either constipation or diarrhœa, and no noticeable effect seemed to be produced upon the heaves. At times she was quite frisky and playful. When she was put on her former ration without molasses, a marked falling off took place as shown by the average loss of 34.2 pounds in weight and lessened vigor generally. A summary of the urinary examinations is shown in the appended table.

HORSE NO. 1.

Date.	Weight.	Sp. Gr.	Solids.	Chlor.	Sulph.	Phosph.	Urea.	Alb.	Sugar.
Dec. 21-25.....	892	1.041	95.53	13.45	2.25	0.84	35.25	....	....
Dec. 25-28.....	878	1.031	73.39	8.09	1.5	1.08	20.	....	....
Dec. 28-Jan. 12.	865	1.042	98.85	15.80	1.85	2.	13.14	....	Present
Jan. 12-25.....	873	1.039	91.29	11.57	2.08	1.98	13.08	Present	"
Jan. 25-Feb. 8. .	883.6	1.040	93.66	....	0.8	1.27	14.2	....	"
Feb. 8-15.....	885.7	1.043	105.2	....	Trace	1.13	23.	....	"
Feb. 15-22.....	889.1	1.038	85.54	4.97	"	0.60	39.3	....	Trace
Feb. 22-27.....	896	1.040	93.20	4.362	"	0.75	35.5	....	Present
Feb. 27-Apr. 2 .	861.8	1.0426	99.34	3.998	"	1.25	32.9		

The urinary figures in this table represent parts per 1000.

No. 2 was a mare well along in years and in good condition. Her weight, averaged from four weighings, before the experiment, was 912 pounds. Her ration had been 4 quarts of bran and 5 or 6 pounds of long hay morning and night. Daily tests

were made of her urine from Jan. 18th to Jan. 25th inclusive, and the normal average was as follows :

Specific gravity . . . . .	1.0342	
Solids . . . . .	79.88	per 1000
Chlorides . . . . .	7.722	"
Sulphates . . . . .	1.	"
Phosphates . . . . .	1.63	"
Urea . . . . .	34.2	"
Albumin . . . . .	Absent	
Sugar . . . . .	"	

On the evening of Jan. 25th the molasses ration was begun (morning and night) as follows :

Molasses . . . . .	1 qt.
Water . . . . .	3 qts.
Bran . . . . .	3 qts.
Cut hay . . . . .	5 lbs.

Like No. 1 she refused her feed at first, but had cleaned her box by the next morning. The next day there was a suspicious trace of sugar in the urine, which became more pronounced the day following, and persisted until the end of the experiment, Feb. 4th.

The average weight of the animal from Jan. 26th to Feb. 4th was 947 pounds—a gain of 35 pounds over her normal weight. At no time during the molasses feeding did her weight fall to normal. During this period seven urine examinations were made and the following average was obtained :

Specific gravity . . . . .	1.0334	
Solids . . . . .	77.88	per 1000
Chlorides . . . . .		
Sulphates . . . . .	0.7	"
Phosphates . . . . .	1.47	"
Urea . . . . .	13.5	"
Albumin . . . . .	Absent	
Sugar . . . . .	Present	

The great decrease in urea during the molasses ration is very striking. On her way back from the scales, Feb. 4th, the mare fell on the ice and required assistance to rise. When returned to her stall she showed labored breathing and again lay down. She could not be induced to rise, and as she seemed to be in a serious condition, she was killed and a post-mortem held the next morning. The point of the ilium was found to be fractured ; there was also some hæmorrhage in the sublumbar

region. Some frothy blood was noted near the duodenum. The diaphragm was ruptured and the intestines protruded into the thoracic cavity. Whether this resulted from the fall or not we do not care to say. Ruptured diaphragms are encountered occasionally in the dissection room, probably as a result of bloating. In this case there was an interval of about fifteen hours between the death and the post-mortem, and the cool February weather was not especially conducive to fermentation processes. In the dissection it was noticed that the tissues seemed to have a greasy "feel," suggesting the presence of fluid fat.

A series of five blood examinations was made before the molasses was fed, and a similar number made while it was being fed. The average of each series is as follows:

	Red cells.	Leucocytes.
Before molasses. . . . .	7,125,480	5,265
During molasses . . . . .	5,768,228	5,434

The balance of the red cells is in favor of the normal period, while for the leucocytes a small balance is shown in favor of the molasses. The result is interesting, but more experiments are necessary before arriving at definite conclusions as to the effect of the molasses upon the blood.

No. 3. This subject was a mare well along in years, afflicted with sweeny but otherwise in quite fair condition. From Feb. 5th to Feb. 13th her ration consisted of 3 quarts of oats and 5 pounds of hay, morning and night. Her average weight during this period was 704.5 pounds. Through an unfortunate misunderstanding the records of the normal urine were not kept completely and cannot therefore be used for reference, except that it was determined that no albumin nor sugar were present.

A prepared food was used in this experiment, consisting of blood, molasses and chopped cereal. The proportions of the ingredients not being given. The use of this food was begun on the evening of Feb. 13th by withdrawing some of the oats and substituting the same amount of the new food, until on the 17th she was getting the proportion recommended by the manufacturers, namely: 1.5 quarts of oats, 2.5 quarts of the prepared food with the hay as usual. This proportion was continued

until Feb. 25th. During this period her average weight increased to 727.1 pounds. Three urinary examinations were also made during this period with the following average :

Specific gravity . . . . .	1.0366	
Solids . . . . .	85.43	per 1000
Chlorides . . . . .		
Sulphates . . . . .		
Phosphates . . . . .	2.19	"
Urea . . . . .	16.6	"
Albumin . . . . .	Absent	
Sugar . . . . .	Present	Feb. 25th

On the evening of Feb. 25th she was fed 5 quarts of the prepared food and the oats were altogether withdrawn. Hay as usual. This was continued until March 12th. During this period her average weight increased to 765.4. Seven urinary examinations were made and gave the following average :

Specific gravity . . . . .	1.0442	
Solids . . . . .	103.18	per 1000
Chlorides . . . . .	4.664	"
Sulphates . . . . .	Trace	
Phosphates . . . . .	2.45	"
Urea . . . . .	25.1	"
Albumin . . . . .	Present	Mar. 10th and 12th.
Sugar . . . . .	"	

The gain in solids, especially urea, is noticeable. From the evening of March 12th to March 29th the ration was changed to 2 quarts of the prepared food, with 3 quarts of bran. Hay as usual. The average weight for this period increased to 792.8 pounds. Six urinary examinations for this period averaged :

Specific gravity . . . . .	1.0401	
Solids . . . . .	93.58	per 1000
Chlorides . . . . .	8.36	"
Sulphates . . . . .	Trace	
Phosphates . . . . .	1.51	"
Urea . . . . .	20.3	"
Albumin . . . . .	At intervals	
Sugar . . . . .	" "	decreasing.

There was a little sugar present at the beginning of this period, but it quickly disappeared. Albumin was found March 17th, 24th and 26th.

During the next period, from March 29th to April 15th, it was decided to give an increased amount of the molasses

constituent; the amount of the bran was reduced a little, with a corresponding increase in the prepared food; to this was added 1 pint of molasses morning and night. The animal was weighed twice during this period and the average was 788 pounds. Four examinations of urine were made and gave the following average:

Specific gravity. . . . .	1.0477	
Solids. . . . .	111.26	per 1000
Chlorides. . . . .	4.544	"
Sulphates. . . . .	Trace	
Phosphates. . . . .	2.78	"
Urea. . . . .	14.25	"
Albumin. . . . .	Present, not constant.	
Sugar. . . . .	" " "	

From the evening of April 15th to the 18th, inclusive, the mare was fed 5 quarts of prepared food and 2 quarts of molasses twice daily, with hay in usual amount, but of a poorer quality. On the 18th, when the animal was killed, her weight was 851 pounds, showing an increase of 146.5 pounds over her normal average weight. The urine was examined April 18th and showed the following results:

Specific gravity. . . . .	1.043	
Solids. . . . .	111.19	per 1000
Chlorides. . . . .	9.451	"
Sulphates. . . . .	Trace	
Phosphates. . . . .	1.4	"
Urea. . . . .	9	"
Albumin. . . . .	Absent	
Sugar. . . . .	Pronounced	

The decrease in urea is pronounced and this may be correlated with the increased carbo-hydrate diet. The following table is a summary of the urinary examinations:

HORSE NO. 3.									
Date.	Weight.	Sp. Gr.	Solids.	Chlor.	Sulph.	Phosph.	Urea.	Al.	Sug.
Feb. 5-13 (N <sup>o</sup> mal)	704.5	....	....	....	....	....	....	....	....
Feb. 13-25.....	727.1	1.036	85.43	....	....	2.19	16.6	....	Feb. 25
Feb. 25-Mar. 12.	765.4	1.048	103.18	4.664	Trace	2.45	25.1	(Mar 10-12)	
								Present	
Mar. 12-29.....	792.8	1.040	93.58	8.38	"	1.51	20.33	(At intervals)	
Mar. 29-Apr. 15.	788	1.0477	111.26	4.544	"	2.78	14.25	Present	Present
Apr. 15-18.....	851	1.043	101.19	9.451	"	1.40	9	Absent	"

In this table the urinary figures refer to parts per thousand. Like No. 2, there was an increase in the body weight after



the molasses food was used. The animal was in good spirits throughout and her coat was smooth and glossy. When the animal was dissected the same greasy condition was noted as in No. 2.

After the death of the animal, sections of the liver and kidney were studied histologically. The following report was kindly furnished by Dr. S. H. Burnett, of the Pathologic Department:

*Liver.*—The liver shows marked parenchymatous degeneration throughout the entire lobules. The cells are swollen so that the capillaries are very narrow. The cells are coarsely granular and the nuclei pale. The central vein and the peripheral vessels are congested. There are a few leucocytes in the connective tissue surrounding the peripheral bloodvessels. The conditions indicate acute parenchymatous hepatitis.

*Kidney.*—The glomeruli and vessels near them are congested; the epithelial cells of the convoluted tubules are swollen and coarsely granular; the cells of the straight collecting tubules have lost their granules and are clear, their nuclei seem shrunken.

In the medulla the epithelial cells of the smaller collecting tubules are swollen and coarsely granular, while in the larger tubules the epithelial cells are clear; the nuclei seem to be shrunken. The interstitial tissue in the medulla is thickened by a fibrinous exudate more markedly near the pelvis, while the tubules near the pelvis have mostly lost their epithelium. There is marked congestion especially in the middle portion of the medulla. The indications point toward acute mixed nephritis.

#### GENERAL CONCLUSIONS.

The various reports upon molasses feeding that we have encountered have been uniformly of a favorable nature, but seem to have been based upon external observations as to the general health and condition of the animals. The fact that sugar appeared in the urine of all three of our experimental subjects, soon after the molasses was given, is interesting and perhaps significant. The later appearance of albumin intermittently, in two

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of the cases, is also noteworthy. The presence of either of these substances is usually regarded as an abnormal condition, and yet, during their appearance, the general health of these animals seemed good, and they exhibited more vigor than before. Albumin and sugar serve as foods for the tissues, their undue loss through the kidneys would mean a drain upon the system, a distinctly pathologic condition. Their elimination intermittently or in small amounts may represent a physiologic condition, merely the removal of an excess of the given substance in the system.

With regard to the constituents of the urine, the most striking effect of molasses feeding was upon the urea. This constituent invariably fell considerably below normal when molasses was used. Perhaps, in a general way, this may be due to the fact that the molasses contained less material from which urea might be formed. In a carbohydrate diet the nutritive ratio is wide. (Beet molasses, however, has a ratio of 1:6.5.) When an increased body weight occurs, this may be due to the conversion of the albuminoid material in the ration into tissue forming substances and thus account for the diminished urea. In subject No. 1, however, there was at first diminished urea and decreased weight. As this subject was afflicted with a pathologic condition (heaves), it is not unlikely that the body metabolism was influenced and some irregular results produced in connection with the molasses feed. The pathologic conditions noted in No. 3 would likewise have an important influence upon the elimination of urea; the diseased epithelial cells being no longer able to do their work properly, it might be expected that the urea would be stored up in the system.

The phosphates fluctuated considerably; the sulphates, although fluctuating somewhat, had a marked tendency to diminish as the experiment progressed. The chlorides were unreliable on account of some errors in the early part of the experiments; the later data showed that they had a tendency to diminish. All of our experiments agree in the fact that abnormal constituents (sugar, and some albumin) were found in the urine,

soon after the molasses ration was begun. In the only case examined histologically, marked pathologic conditions were present in the liver and kidney. It would be difficult, without further observations, to prove that these conditions were caused directly by the molasses; but the fact that all of the urines contained abnormal products seems to be significant in this connection. We do not go so far as to state that the results above mentioned are present or are to be expected in all cases, where molasses is used as food. The title of our paper limits it distinctly to horses at rest and even here the results may not be uniform. Age is quite likely to be a factor. All of our subjects were quite well advanced in years and the tissues, more or less worn out with the wear and tear of advancing age, were doubtless either more susceptible or less responsive to any unusual demands made upon them. In horses doing work it is quite reasonable to suppose that the effects we have described may not appear to any noticeable extent if at all. In general, a rich carbohydrate diet is productive of much energy. If this energy is used up in the accomplishment of work it is an economic arrangement so far as the body tissues are concerned. If on the other hand, this energy is stored up in the system without adequate outlet for escape, the effect upon the tissues must be pronounced and the results that we have encountered might be expected.

Molasses is a concentrated food and an undue proportion of it in the system, under any condition, may be productive of more harm than good. Its value as a food is generally accepted, but, it seems to us, there should be certain reservations as to amount and time of feeding, dependent upon the age and amount of work done by the animal.

A careful study of the nutritive ratio in all rations into which molasses enters as a constituent is important.

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"THE man behind the gun of steel, Has earned his laurels well; But the man behind the automobile, Is the man who gets the smell."—(*Life*.)

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## REPORTS OF CASES.

*"Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations, he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science."*

### A MONSTROSITY FROM INDIANA.

By T. M. HALL, V. S., Thorntown, Indiana.

I was called to the stable of R. M. Dunbar, Bowers Station, Ind., Aug. 16, 1904, and found a registered poll Durham cow in labor. The neighbors and an empiric had been unsuccessful in their attempts to deliver her, and, after four hours of hard labor, I was able to deliver the monstrosity whose picture is given herewith. The cow is thriving all right at present.



All four feet and head were making their appearance. It has four legs, but only one in front, and this is in the side of the thoracic cavity, where the lungs and heart should be. The heart and lungs are in a sack on the outside of the right side of the thoracic cavity. The heart is normal in size; the lungs are not well developed; the abdominal cavity is minus and the vertebræ are all ankylosed solid. In delivering this calf I had to break the vertebræ and take it away one piece at a time. You can see its umbilical cord on its back, and the intestines are

laying loose in the placenta. All but the liver appeared normal in size, which is simply one big lump and much larger than normal. The hair on its neck only extended a short distance; the hips and limbs were well haired; the top of the back, and ribs and tail were hairless. Its tail and anus were where the scrotum should be. The generative organs, well developed, were on his back. It is a male calf. One leg came out at the superior part of the ilium, and when lying on its side this would stick straight up and was solid to the ilium.

I think this calf was alive until the umbilical cord was broken. The period of gestation was of the right duration. The mother was in good health and was a show cow.

# INTESTINAL OBSTRUCTION IN HORSE—THE VALUE OF POST-MORTEM.

By FRED. W. PORTER, D. V. M., Tampa, Fla.

In Dr. Reeks' work entitled "Colics of the Horse" under the head of "Obstruction of the Small Intestines," he speaks of the lack of post-mortem records of such cases. I have just had such a case, and, thinking that possibly the record might be worth having, I send it to you.

The animal was a bay gelding, about 1,000 pounds weight, a driving horse, in good condition. I was called about noon of Oct. 26th, last. History was that the horse had been used and was in apparently good health the day before; had eaten his supper, but began to act colicky within an hour or so afterwards; had passed urine, but no bowel action since previous day. Diagnosed the case as impaction, and located pretty far forward. Explored per rectum, to full extent of arm; found it empty as far as it could be reached, and could feel nothing in surrounding bowels. Exploration produced considerable straining as if to defecate, but no result. Used eserine (gr. ij), got more straining, but nothing else. Left a prescription for ol. terebinth., ar. spts. amm., and ol. lini, to be given at once, and went for rectum tube. This latter I passed, six to seven feet, three to four times a day for two days. Other treatment was amm. carb. and nuc. vom. The animal lived until the afternoon of the 29th, constantly getting down and up and looking at one flank and then the other. The water used in injections always came away clear. I was present when he died and held a post-mortem at once. All the large intestine, cæcum and small intestine clean and empty, except some water left from injections, up to within six feet of the stomach. At this point I found a mass, four inches in diameter and shaped exactly like a very large apple. On cross section it looks like brown felt and is the same from centre to circumference. The bowel for about a foot from this mass, towards the stomach, was much thickened and dark in color, and the rest of the intestine and stomach contained his last feed and such of the medicines as had not been absorbed. I have the specimen removed in my office, but lacking a camera I can't send you a picture of it.

INOCULABILITY OF OSTEOMALACIA.—MM. Charrin and Moussu have succeeded in giving rabbits experimental osteomalacia by inoculation under the skin of an emulsion of bony marrow from a pig affected with the disease.

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## EXTRACTS FROM EXCHANGES.

## ITALIAN REVIEW.

By Prof. A. LIAUTARD, M. D., V. M.

AN ÉPIZOÏTIC OUTBREAK OF PARONYCHIA GANGRENOSA [*Oreste Fantin*].—After a very rainy season last December, in a stable of Trieste, out of thirty horses nine were simultaneously laid up with the above-named trouble. All the horses were heavy draught animals, and worked in mud and slush most of the time. In examining the stock nine were observed presenting more or less lameness; some, in fact, had to stop work. Their gait was more or less changed, and a swelling extending all around the coronet up to the fetlock, existed on all extremities. There was also fissures through the skin, from which escaped a viscous bloody discharge. In some it was almost impossible to walk. Posterior as well as anterior extremities were equally affected, in various degrees of severity. With a few the swelling was followed after two or three days by a slough of the skin, leaving underneath an ugly ulcerated surface. Even sometimes the wall of the foot was partly loose. Lymphangitis was present in many. There was in all loss of appetite and elevation of temperature. The most successful treatment was obtained by the use of tannoform; in five weeks the animals resumed work, with only one exception. The chemical analysis of the water in which the horses had to stand while at work revealed that it contained large quantities of salt (carbonate of lime, chloride of sodium, of magnesium with sulphates of magnesium and of lime), and no doubt this irritating mixture, added to the effect of cold and dampness, and perhaps, also, a predisposing condition, all taken together, explain the apparent epizootic character of the disease.—(*Clinica Vet.*, July 30, 1904.)

TUMORS IN THE STOMACH OF A STEER [*Dr. A. Bragadin*].—After being affected with a diarrhœa, which resisted all kinds of treatment, a steer, which stopped ruminating and began to lose flesh, was brought to the slaughter-house and killed. In the abdominal cavity a certain amount of serosity was found, the liver rather enlarged, the spleen and kidneys normal. At the opening of the stomach two large tumors were found—one in the rumen, with a wide base, cauliflower in form and as big as the head of two men; it weighed 4 kilograms. 460 grammes; the

other was in the reticulum and weighed 2 kilogs. 230 grammes. Both were fibro-sarcomatous in nature. In all its length, the small intestine was slightly cedematous and filled with liquid faeces.—(*Clinica Vet.*, July 16, 1904.)

FOUR CASES OF CRYPTORCHIDY IN HORSES [*Dr. Domenico Bernardini*].—In thirty-four years the surgical clinic of the Royal Veterinary School of Milan has had seven cases of cryptorchid horses brought there for operation. The first three were operated upon respectively in 1887, 1891 and 1897, the operation being the Belgian method. The author records the other four cases. *The first* had been castrated on the right side only, the left remained in the abdomen. The animal was vicious, the operation laborious; comatous condition lasted some length of time after, but recovery was complete in about three weeks. The testicle weighed 95 grammes. With this horse the operation was performed by inferior laparotomy, viz.: Incision of the abdominal walls, parallel to the sheath, above and a little in front of it, which being 15 centimetres in length allowed the entrance of the hand. The incision was closed by sutures of the peritoneum first, of the skin and muscles afterwards. *The second* horse had never been castrated. He was not ugly, but might become so. Most minute exploration failed to give any hint about the location of the testicles. The method of operation was similar to the preceding case, viz.: inferior laparotomy. Notwithstanding careful exploration and researches with the hand in the abdomen, not the slightest trace of testicle could be found, and, after twenty minutes of exploration, the operation had to be given up. The horse was quite sick after this attempt, but finally got well; he was afterward sold and lost sight of. In *the third* the right testicle had not come down, in a four-year-old colt. He also was operated upon by inferior laparotomy, and his case was most satisfactory, the horse resuming work twelve days after being operated. *The fourth case* was a horse castrated on the left side only. On examination of the scrotum, a round body was detected in the inguinal region. Rectal examination revealed nothing. The horse was cast and the steps for the operation (Belgian method) were begun. A mass of fat and connective tissue was removed from the inguinal canal. It was then too late to resort to inferior laparotomy to remove the testicle. The operation was then completed through the inguinal canal, and the testicle removed with the ecraseur. The animal did well at first, then had bad symptoms, complication of eventration with protrusion of the

intestine followed, etc., and finally death. To resume: Seven cases were operated, and of the last four, 3 operated by inferior laparotomy recovered, 1 by the Belgian method died.—(*Clinica Vet.*, Nos. 31, 33, 35, 39, 1904.)

AMMONIA IN THE TREATMENT OF FISTULA OF STENO'S DUCT [*Dr. Guiseppe Buttace*].—Several liquids have been recommended to obtain the obliteration of the parotid secretion. The latest innovation is the use of liquid ammonia, recommended in 1849 by Haubner. Prof. Lanzillotti-Buonsanti has also recommended its use, indicating 20-30 grammes as the ordinary dose. The author of this article had a mule of large size brought to him for treatment, because of the fistula of Steno's duct, due to laceration by a bite from another animal. He preconized ammoniacal treatment and to that effect injected in the canal by the central end 30 grammes of aqua ammonia, which was considered as sufficient, as the gland felt full. The flow of saliva stopped immediately. After 36 hours the region was enormously swollen, dyspnoea was marked, and tracheotomy likely to be necessary. This was not the case, however, but soon symptoms of gangrene of the parotid gland were manifest. It sloughed out, leaving a large cavity, which took a long time to heal. The conclusions of the author are that 30 grammes are evidently too much, and that a smaller quantity must be used, if one wishes to produce the atrophy of the gland by this method.—(*Il Nuovo Ercolani*, June 15, 1904.)

CONTRIBUTION TO THE SURGICAL TREATMENT OF CARCINOMA OF THE PENIS IN HORSES [*Prof. Bossi*].—Having observed in several instances unsatisfactory results after the operation for carcinoma of the extremity of the penis by the usual classical treatment, the author decided to resort to a different method by which the extremity of the penis is brought to the perineal region and opened a little back of the scrotum. The following is the technic of the operation: The animal is cast on the right side and fixed as for the operation of castration. The region being well disinfected, a V-shaped incision, opening forward, is made through the scrotum; the skin is dissected backwards. The incision is then extended back along the perineum, starting at the angle of the V. The preputial orifice is opened, the tissues divided with the scissors, so as to isolate the penis. The organ is then pulled outwards and surrounded at its base, above the seat of the amputation with an Esmarch band. The amputation is made with the bistoury; the arteries ligated and the cavernous body cauterized with the red iron. Bossi thinks

the dissection of the urethra and its suture to the cavernous body, are useless. The edges of the preputial, scrotal and perineal surfaces are brought together and the extremity of the penis is secured in the commissure of the perineal incision in such a way that the divided surface corresponds to the perineum. The urethral section is sutured to the cavernous body by two stitches. Two horses operated in this way did very well. The urethral opening, situated back of the sheath, was almost entirely concealed, and the animals did not seem incommoded by their new condition.—(*Il Nuovo Ercolani*, June and July, 1904.)

**OSTEOCHONDRO-SARCOMA OF THE FOREARM IN A DOG** [*Felice Anotti*].—A large dog, seven years, in good health, weighing as much as 84 kilogrammes, one day without any cause had a swelling of the left radio-carpal joint, which made him quite lame. This enlargement has grown during the last few months, and to-day the leg, principally at the lower part, is the seat of an enormous swelling, notwithstanding an iodurated treatment externally, as well as internally, prescribed by a veterinarian. The comparison between the two fore legs shows the size of the swelling. The circumference at the plantar cushion is 20 centim. on the sound leg and 26 on the other; the knee of the healthy leg measures 18 centimetres and that of the diseased one 39; the forearm of the right leg is 20 centim. in circumference, that of the left is 25. After nine months of that condition the dog has a wretched appearance; it is pitiful to see him walk; he has lost his appetite and now weighs but 55 kilogrammes; the swelling extends to the elbow; it is rather irregular in its outline, except to the knee, where it has the shape of a quite large spherical cap. The skin is rosy, shining, erysipelatous-like; the hairs are short and have dropped off in places. Here and there are sores that the dog has inflicted upon himself in walking. On the convexity that is present at the knee, a point of deep fluctuation is felt and an exploring needle thrust in it brings out a little bloody serosity. Prof. Vanditta, to whose clinic the dog was brought, made a diagnosis of osteo-sarcoma of the radio-carpo-metacarpal joint; gave a fatal prognosis and advised amputation as the only chance of saving the life of the dog. This was performed without great trouble, and recovery was perfect in twenty days.—(*Il Nuovo Ercolani*, June 15, 1904.)

**A CASE OF IDIOPATHIC EPILEPSY IN A BOVINE** [*Dr. Arnolfo Zangheri*].—Symptomatic reflex and traumatic epilepsy are more or less frequent, but those of idiopathic nature are few.

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Lafosse, out of 25,000 dogs he has examined, observed 225 of various forms; out of 130,000 horses he saw only 22 cases, and out of 16,000 cattle he noticed only 7. It is not said if there were any of idiopathic nature. The author relates this case to add to the history of the disease. The subject was a young heifer which for two or three days had abdominal pains with some general manifestations of enteritis. The farm hand, however, reported that he had observed the animal having something amiss (she struggled, fell down, etc.), but these remarks were rather ignored, and a diagnosis of diarrhœic enteritis with bloody passages was made, and treatment prescribed accordingly. After a couple of days the condition seemed improving, but still the man who took care of her reported her having had two attacks, the last one being more severe and the animal having convulsions and slobbering abundantly at the mouth. Suspecting that epilepsy might exist a more minute examination of all the functions was made. The heart was weak, yet the conjunctivæ were congested; the bottom of the eye, with the ophthalmoscope, showed slight injection; the animal was rather sensitive to light; the poll of the head was rather painful; there was pain on percussion of the cranium on the left side, principally on the parietal and frontal. While the examination was being carried out the animal was taken with a severe attack. She fell down suddenly, taken with tonic and clonic convulsions; there was trembling of the whole body, the muscles of the abdomen and the diaphragm seized with spasms, respiration was difficult and irregular, pulse small and quick; conjunctivæ and other mucous membranes, which first were pale, became rather cyanotic, the mouth was opened and closed in convulsions, there was grinding of the teeth, escape of saliva, and rotatory motions of the eyes in the orbits. The attack lasted about three hours, with intervals of quietness. After a few days, while the attacks recurred at various times, the animal was killed. The post-mortem examination was negative. The abdominal organs were healthy. The brain showed no lesion except that the meninges looked slightly congested. The tissue proper of the brain was apparently normal. From this condition the author concluded that the animal had suffered with a genuine primitive or idiopathic epilepsy.—(*Clinica Vet.*, Oct. 8, 1904.)

THE regular veterinary profession of Michigan is claiming a great victory in the recent election, as the Governor-elect, Hon. F. M. Warner, is an avowed enemy of fakism, quackery, etc.



## ROUMANIAN REVIEW.

By Prof. A. LIAUTARD., M. D., V. M.

CLINICAL OBSERVATIONS AND RESEARCHES UPON THE TRICHOPHYTON TONSURANS [*Prof. T. D. Poenaru*].—In March, 1903, the author observed among the animals of a farm in the neighborhood of Bucharest, a skin disease, with an enzoötic character in the animals and endemic in men. Besides the 25 bovines that were affected, six persons were also diseased. On the animals, there were on the skin patches, well circumscribed, and covering the head, neck, back and even the lateral faces of the thorax. These patches were covered with thick crusts, the hairs being brittle. On some places the hair follicles were inflamed and an alopecia of short duration observed. Two men who cared for the animals had on the arm and forearm red, round patches, lenticular and squammy, with red borders around, others had similar eruptions on the head, a true herpes tonsurans. Examination of the hairs and crusts made under the microscope and experiments made upon rabbits revealed the nature of the disease, the *Trichophyton tonsurans*.—(*Arhiva Veterinara*, No. 1, 1904.)

DOUBLE VENTRAL HERNIA—TUMOR OF THE RIGHT MAMMÆ IN A SLUT—OPERATION—RECOVERY [*Prof. O. Udrischi*].—A ratter slut in good condition has great difficulty in walking because of the presence of two tumors hanging between her hind legs. That of the left side is the older and is increasing in size. It is evidently a ventral hernia, which is reducible. On the right side there is a tumor, which is not painful, hard, irregular towards its lower part. It is as big as two fists, and has some ulcerated spots, from which a grayish foetid substance oozes out. Towards its base this tumor is soft, depressible and elastic. A double operation is indicated and performed while the dog is under the influence of chloroform. The tumor on the right side was extracted first, and as a ventral hernia was then detected, the intestines were returned in place and the wound closed by stitches. On the left side the hernial sac was made loose from the surrounding tissues and removed, the intestines put back in their place, the ring closed with one stitch and the skin sewed up. Both wounds were covered with sublimate collodion, and a compressive wadding dressing applied. Recovery went on without complication.—(*Arhiva Veterinara*, No. 2, 1904.)

THE TREATMENT OF PERIODIC OPHTHALMIA WITH IODIDE OF POTASSIUM [*Prof. C. Gavrilescu*].—Following the recommendations laid out by those who have already recommended the use of iodide of potassium in the treatment of periodic ophthalmia, the author has resorted to it in two bad cases, and obtained excellent results. The symptoms were well marked and quite severe. The treatment consisted in the administration per mouth of 15 grammes of the iodide in two doses and the application over the eye of compresses of solution of the same drug (3 per cent.), compresses which were changed four times a day. In the first case improvement was noticed on the third day, and after seven days of treatment all the symptoms had disappeared, the eye being perfectly clear. No new attack has occurred after a year. In the second horse, the eye was better after the first day. The third and the following days the symptoms gradually disappeared. In a week recovery was perfect, and no trouble has arisen since.—(*Arhiva Veterinara*, No. 2, 1904.)

FOREIGN BODY IN THE STOMACH OF A CAT—GASTROTOMY—RECOVERY [*Prof. G. Udreschi*].—Foreign bodies, says the author, reach the stomach in different ways: (1) they may be taken with the food; (2) they may be introduced by error or accidentally; (3) they may come from outside after passing through the abdominal walls; or, (4) they may be taken voluntarily by the animal having a depraved taste. The case in record belongs to the second category. A six-months-old cat, owned by a lady, has a cough and refuses her food. She salivates abundantly. To examine her mouth and see if there is not something in the animal's mouth, the owner takes a tortoise shell hair-pin, introduces it in the mouth and inadvertently lets it drop in the cat's throat, whence it passes into the stomach. Indeed, on feeling the epigastric region the foreign body is readily detected. The animal is etherized, the epigastrium is shaved, washed and thoroughly disinfected. With care the abdomen is opened; the stomach and the liver protrude suddenly. The stomach is secured with two forceps of Pean, about one centimetre apart, and an incision made between, through the stomachal walls. The pin was extracted. After disinfection a muco-mucous suture with catgut was made, then a sero-serous, and the organ returned in its place. The abdomen was closed with three stitches, first one on the peritoneum, a second on the muscles and a third of the skin. Sublimate collodion and wadding dressing closed the operation. Cicatrization by first intention was complete in eleven days.—(*Arhiva Veterinara*, No. 3, 1904.)

## ARMY VETERINARY DEPARTMENT.

### PROGRESS OF THE ARMY BILL.

FORT ASSINNIBOINE, MONT., November 15, 1904.

*Editors American Veterinary Review :*

DEAR SIRs:—It is with pleasure that I acknowledge through the "Army Veterinary Department" the receipt of a number of letters from army colleagues inquiring about the fate of the Army Bill. It has been impossible for me to reply to these letters, giving reasons for the delay, as I had been detailed to compile the necessary data and statistics of our own and the foreign army veterinary services, which are to accompany the Bill as inclosures, and which are required of any document forwarded for consideration of the General Staff. This addendum has been finished and sent for approval to Drs. Plummer and Griffin, who are to sign it. The Bill as altered and approved by our representation at the St. Louis meeting, has been printed and is being distributed to all concerned. At what time the document can be properly and safely started cannot be stated at this writing, but our army colleagues can feel assured that those to whom has been assigned the difficult and important task of having it properly endorsed, are apparently using most commendable prudence and foresight, and it would be wise not to bring any pressure upon them, but leave the choice of person and time to their own discretion. OLOF SCHWARZKOPF.

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### ARMY VETERINARY NOTES.

The following notes are taken from the *Army and Navy Journal*, November 5, 1904:

*Veterinarian Alexander Plummer*, 4th Cav., chief instructor of the training school for farriers and blacksmiths, and Miss Adelaide Bell, of Chico, Cal., were married in the post on Saturday morning, by the Rev. C. T. Harshaw, of Junction City. The wedding was a great surprise to all. The happy couple left for the East on the noon train on a short trip, after which they will be at home in the Cavalry post.

*Board of Examiners for Army Veterinarians.*—A board of officers to consist of Lieut. Col. William Stanton, 11th Cav.; Capt. William J. Snow, Art. Corps; Veterinarian Alexander Plummer, 4th Cav.; 1st Lieut. Llewellyn W. Oliver, 8th Cav., recorder, is appointed to meet at Fort Riley, for the purpose of

conducting examination of applicants for appointment of veterinarians of Cavalry and Artillery.

*Salute to the Veterinarian.*—*The Army and Navy Journal* of November 5, in a reply to a question of a correspondent, stated that army veterinarians are *not* saluted by enlisted men. Being at once informed of their error, the editors of the *Journal* promptly corrected their mistake, which is acknowledged with much pleasure, as they formerly overlooked similar corrections with a rather ominous silence. Their note is as follows: "L. M. M.—Although the Army Regulations provide only for the salute of officers of the Army, Navy, Marine Corps, Volunteers and Militia, from enlisted men, we find that Par. 9, Army Regulations, edition of 1904, gives a veterinarian of Cavalry or Artillery, rank next after a 2d lieutenant, and by decision of the Secretary of War, May 9, 1902, as their duties are such as to require them to give orders to enlisted men, they are entitled to receive the customary salute from enlisted men. Our answer given in our issue of Nov. 5, must be modified accordingly."

### CORRESPONDENCE.

DR. CONKEY'S PRINTER EXPLAINS, AND INCIDENTALLY GIVES THE DOCTOR A LITTLE FREE ADVERTISING.

GRAND RAPIDS, MICH., Nov. 16, 1904.

*Editors American Veterinary Review:*

DEAR SIRs:—Referring to the article on page 720, of the November issue of the REVIEW, in which you accuse Dr. L. L. Conkey of plagiarism, allow me to say that the typographical work of the *International Veterinary Review* is done by the West Michigan Printing Co., of which I am Manager, and can say that Dr. Conkey has always been very explicit in his instructions to us regarding just such matters as the one referred to in said article, and the issue containing the "European Chronicles" was published during the Doctor's absence from the city; he never saw a copy of it until some time after it had been mailed to his subscribers, the whole error resting with the foreman of this office.

Trusting that you will make this correction in justice to Dr. L. L. Conkey, who is a very conscientious and honorable business man as well as the leading veterinarian of this city, we promise that you will have no further cause for complaint.

WEST MICHIGAN PRINTING COMPANY,

*By E. Rice, Business Manager.*

SMALL ANIMALS HAVING TUMORS WANTED BY THE UNIVERSITY OF PENNSYLVANIA.

UNIVERSITY OF PENNSYLVANIA,  
DEPARTMENT OF MEDICINE.  
PATHOLOGICAL LABORATORY.  
PHILADELPHIA, Nov. 8, 1904.

*Editors American Veterinary Review :*

DEAR SIRs:—It is desired to carry out in this laboratory some researches in reference to the growth of tumors. For this purpose there will be needed a number of animals afflicted with tumors: dogs, cats, rats, mice and fowls especially are desired. It will be a great favor to me if any veterinarian will be kind enough to communicate with me in reference to any of the above mentioned animals suffering from a tumor of any sort. Only living animals can be used. Transportation and other charges will be paid. The animals will be paid for, if required, provided the price is within reasonable bounds.

Very respectfully, DR. LEO LOEB.

TO CURE TONGUE-LOLLING.

MARINETTE, WIS., Nov. 12, 1904.

*Editors American Veterinary Review :*

DEAR SIRs: I note in the November issue a query from Dr. A. P. Drew in regard to the habit of tongue-rolling, and would recommend to him the following: Take a piece of bicycle tire inner-tubing the length of bit and slip it over the bit; then insert the small bit used with an over-draw check through the tubing and buckle in the bridle in the ordinary manner. This effectually prevents the habit of tongue-rolling in every case that I have tried it on.

Yours truly, W. G. CLARK.

AN ECHO FROM THE CLASS ROOM.

HOUSTON, TEXAS, Nov. 14th, 1904.

*Editors American Veterinary Review :*

DEAR SIRs:—Under the head of "Correspondence" in November issue of the REVIEW, I note over signature of Seth P. Talbot, comments on veterinary degrees. While I heartily endorse his remarks with one exception, that being his concluding assertion, I think it would interest a considerable number of REVIEW readers to hear from Dr. Talbot as to "WHO stole the monkey." (Class joke.)

Respectfully,

M. R. S. (M. D. C.)



## SOCIETY MEETINGS.

### NEW YORK STATE VETERINARY MEDICAL SOCIETY.

DETAILED REPORT OF THE CLINICS HELD AT BROOKLYN, N. Y.,  
SEPT. 13, 14 AND 15, 1904, WITH SOME ADDITIONAL  
CASE REPORTS CLOSELY RELATED TO  
THE MEETING.

By W. L. WILLIAMS, Ithaca, N. Y.

The editor of the REVIEW has stated on page 692 of the October issue that "we believe the 1904 clinic was the very best ever held in this country or perhaps in the world."

In order to substantiate this assertion it needs appear that the clinic was planned with some definite worthy object in view which was fully realized.

For what did the clinic stand?

Again the editor has anticipated us by holding on pages 628 and 629 of the October issue that the value of a clinic depends upon the presentation of cases or operations having an everyday value to the ordinary veterinarian. A study of the following report will show that the operations done were advisable from both the humanitarian and economic standpoints, that they were satisfactorily successful in their aim, and that no problematical or display operations were introduced. The instruments and appliances used were neither elaborate nor expensive. A very ordinary operating table of an old pattern was used, the stocks could be constructed by a veterinarian himself almost unaided, and aside from a mare-spaying ecraseur for one operation and an emasculator for another, the instruments used would cost about \$10.00, and with these were employed the oldest and cheapest disinfectants.

Without ignoring the great number of the cases entered in the clinic for diagnosis and observation, we may suggest in advance that the operative clinic had for its goal largely the teaching of:

1. The necessity for chloroform anæsthesia in major surgery.
2. Cleanliness-antisepsis.
3. That the ultimate success of an operation depends pri-

marily upon the fidelity of the operator to every detail and loyalty to modern surgical methods.

4. That the failure of an operation in the hands of one man is not conclusive evidence that the technic or the procedure itself is fundamentally wrong.

The clinics of the meeting do not stand out wholly alone, but are inseparably linked with a series of operations beginning some weeks prior to the meeting and continuing for a day after the close of the convention, so that we find it expedient to include such of these as have a definite relation to the programme which was presented. Cases not originally presented or operated on during the clinic proper will be designated by having their number enclosed in ( ). We shall ignore chronologic order and attempt to present the cases in advantageous groups.

#### A. MISCELLANEOUS CASES PRESENTED FOR DIAGNOSIS OR OBSERVATION.

§ I. *Cases presented Sept. 14, at the hospital of Dr. Hanshew, 125 Carlton Avenue. Cases 1-6 presented by Dr. Hanshew, case 7 by Dr. Ackerman.*

1. A bay draft gelding, having four epithelial tumors in the region of the posterior fetlocks, each about three inches in diameter and very deeply and intimately attached to the subjacent tissues. The general opinion seemed to be that their excision would endanger the integrity of the articular and tendinous synovial bursæ and render the prognosis doubtful.

2. A gray draft gelding showing typical farcy in a very virulent form.

3. A bay draft gelding having an unusually large horn tumor greatly deforming the anterior aspect of the hoof and rendering the horse severely lame. The keratom appeared to be 1 to 1½ inches in diameter and extending from toe to coronet. The compressed laminæ were suppurating, with escape of pus upon the middle of the anterior wall. A somewhat general discussion arose as to the efficacy of the surgical removal of these tumors, some reporting that the benefit was permanent, others that the tumor returned and the animal again became lame. The varied experiences suggested the need for careful clinical investigation with a view to determining the value of

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surgical interference and explaining why one practitioner should succeed and another fail.

4. A bay gelding affected with fistulous withers of the ordinary type. Nothing new was elicited in the mode of handling of these very unsatisfactory cases.

5. A black mare showing a somewhat obscure lameness with evident enlargement over the great sessamoids of a posterior limb, to which most of the veterinarians attributed the lameness.

6. A brown mare, with an extensive abscess in the lumbar region.

7. A black driving gelding, suffering from generalized lameness including navicular disease, carpalis, two spavins, etc. The chief lameness at the time was diagnosed as arising from the carpalis, and an unfavorable prognosis given.

§ II. *Cases presented at the hospital of Dr. Geo. H. Berns, 74 Adams Street on Sept. 15, for examination or observation. Nos. 8, 9, 10, 12 and 13 presented by Dr. Berns; 11 by Dr. Hodgson, and 15 by Dr. Runge.*

8. A black gelding with an abscess of the coronet, supposedly due to an infected wound from a projecting nail clinch. Some days after presentation a section of the skin  $1\frac{1}{2}$  inches in diameter sloughed out, the lameness then receded, the wound healed kindly under antiseptic handling and the horse resumed his ordinary work on September 21st.

9. A bay gelding, with dry gangrene "sitfast" on the back. Under ordinary antiseptic treatment he completely recovered by Sept. 25.

10. A black gelding with caries of the right branch of the premaxillary bone due to traumatic injury, of several weeks duration and showing at the time a fistula opening laterally at a point about equi-distant from the incisor alveoli and the juncture of the premaxillary and nasal bones. A probe could be passed to about the normal thickness of the premaxilla at its superior border where it abutted against carious bone. Inside the nostril there was a large exostosis which it was feared would interfere with respiration in event of further growth. At first the fistula had extended through the nasal wall into the nasal chamber, so that fluids injected into the external opening escaped through the nostril. On Nov. 3, the patient remained the same and performed his ordinary work.

11. An aged gray gelding with a large tumor on the right side of the sheath of the penis. The outline of the neoplasm

was ill defined, it had developed rapidly, the centre was breaking down and was very foetid; a detached portion presented the characters of a malignant growth, was diagnosed accordingly and interference discouraged.

12 and 13. Two extra heavy truck horses for observation. One, a brown gelding, weighing 2,400 pounds, of good form and unusually good action for so large an animal. The other was a red roan mare weighing 2,000 pounds, and of exceptional substance and beauty of form combined with excellent action.

15. A chestnut gelding, illustrating the case report which appeared on page 763 of the November REVIEW, presented at the meeting by Dr. Runge on the handling of a severe case of osteo-porosis. The animal was carefully observed at rest and in motion, and much interest expressed in the completeness of the recovery, both in the local manifestations and the freedom of movement.

#### B. MISCELLANEOUS OPERATIONS.

16. Demonstration of the passing of the stomach tube through the nostrils by Dr. Hopper. The intubation was readily accomplished without applying restraint to the animal.

17. A black gelding, presented by Dr. Berns on account of lameness diagnosed as metacarpal periostitis. A well-defined enlargement existed along the inner border of the metacarpus with decided tenderness on pressure. The patient was secured on the operating table on Sept. 13, and with the aid of cocaine anaesthesia median neurotomy was performed by Dr. C. E. Clayton. The operation was skilfully performed under antiseptic precautions and the wound healed without infection, but the lameness was not affected by it, and the lameness remained unchanged on Nov. 1. Was there other disease at a higher point or did the operation fail because the ulnar nerve was left undivided?

18. A brown truck gelding, presented and operated upon by Dr. Clayton because of suppurating toe-crack associated with an extensive horn tumor. The animal was intensely lame. The patient was placed on the operating table on Sept. 14, the affected foot cocained, and the keratom and surrounding under-run horn on each side of the toe-crack carefully removed. Antiseptic bandages were applied and the later handling was along antiseptic lines. Large abscesses developed about the pastern on Sept. 17, and pneumonia set in a little later, from which he died on Sept. 22. While undergoing operation the patient resisted the confinement violently and came from the table bathed



in perspiration, and, anticipating possible danger, the operator had him well rubbed and blanketed, an alcoholic stimulant administered, and placed in a comfortable box. In spite of these precautions the pneumonia developed as the consequence, Dr. C. believes, and there is little reason to disagree with him, of the violent struggles while on the table. We shall have occasion to revert to this case later in our narrative.

19. A chestnut gelding, presented and operated on by Dr. Clayton. The patient showed an unsightly exostosis on the lateral side of the right inferior maxilla at the interdental space, about four inches in diameter and standing out a distance of two inches beyond the normal line of the bone, greatly diminishing the value of the animal and causing the owner to urge an operation in disregard of the uncertainty of marked success. Secured on the operating table and the part cocainized, a longitudinal incision was made over the centre of the tumor throughout its length, the skin and connective tissue were dissected back and the exostosis chiseled away. The exostosis was sclerotic and as dense and hard as ivory, rendering its removal tedious. When the exostosis had been satisfactorily reduced, the surface carefully smoothed and disinfected, the skin was replaced and sutured. The sutures sloughed out after a few days, but the wound was in satisfactory condition on Nov. 1, and the exostosis smaller than prior to the operation.

20. A bay mare, presented by Dr. Berns, unable to properly masticate food and habitually quidding her hay. Examination revealed a split inferior molar. She was placed in the stocks and the extraction of the broken tooth attempted by Dr. Ide, but the crown having been greatly weakened by the splitting, broke off and left the fang in the alveolus. The fang was apparently not in a condition to cause further difficulty and since it could only be removed by trephining and repulsion, it was deemed unnecessary to proceed further unless conditions should demand it. Satisfactory relief was afforded.

21. A three-year-old black colt for castration, presented by Dr. Berns and operated on by Dr. R. E. Waters, with the patient standing. The operation was rapidly and neatly performed and the recovery was prompt.

22. A two-year-old bay cryptorchid, presented and operated on by Dr. R. E. Waters without anæsthesia. The patient was cast and secured with sidelines and the operation performed through the inguinal ring in a very prompt and skilful manner. Recovery was prompt and without incident.



23. A black mare, presented by Dr. Berns and castrated by Dr. Reed, because of nymphomania which rendered her unmanageable and dangerous. Secured in the stocks, difficulty was encountered because of her having been docked so that the tail was not available for compelling a standing position. She acted viciously from the start, straining violently and throwing herself down in the stock sling, rendering operating well nigh impossible. She was finally secured fairly well and forced to stand by removing the rear rope of the stocks which passed behind the buttocks, and on which she sat persistently, and in its stead looping a rope around each thigh and attaching each firmly to an overhead beam in a manner that compelled her to stand or be very uncomfortably suspended by the thighs. Her persistent straining, which was uncontrollable by means of the twitch, was overcome largely by keen blows over the upper lip with the end of a rope. The operation then proceeded without great difficulty, and, considering the behavior of the animal, was quickly and neatly done. The operation was carried out according to the Williams technic, and while precautions were taken against infection it was not surprising, after the difficulties encountered, that slight wound infection did occur on the sixth day, evidenced by colic due to constriction of the rectum as a result of inflammation at the seat of the vaginal incision where it lay against the intestine. The retention of fæces was readily relieved by ordinary means and the animal returned to her accustomed work on Oct. 3, entirely relieved of the nymphomania, and rendered tractable.

24. A bay truck gelding, presented and operated on by Dr. C. E. Shaw for severe stringhalt in both hind legs, the disease being somewhat worse in the right. The disease had been developing very rapidly for three months when operated on, Sept. 15. The parts were sterilized with corrosive sublimate solution, anesthetized with cocaine and an incision about one inch long made through the skin and fascia down onto the peroneal tendon parallel to its long axis. The tendon was raised with an aneurism needle, severed with a curved probe-pointed bistoury, and a piece about one inch excised. The wound was closed by means of two catgut sutures and a bandage applied, which was allowed to remain for two days, when it was removed and the animal returned to its accustomed work. Four weeks after the operation there was very slight, if any, improvement, but whereas the affliction had previously been advancing rapidly it had now become static if not slightly improved.

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C. A SERIES OF CASES OPERATED ON BY, AND ILLUSTRATING  
THE PAPER PRESENTED AT THE MEETING BY W. L.  
WILLIAMS ON "RESECTION OF THE FLEXOR  
PEDIS TENDON," AND APPEARING ON  
PAGE 748 OF THE NOVEM-  
BER "REVIEW."

Since these were cases of urgency, accompanied by intense suffering, they could not be properly held for the meeting, but the convalescing cases were available for observation, and case 26 was shown at the clinic.

(26). A black driving mare, presented by Dr. Berns on Aug. 4, excessively lame in the left fore foot, the result of a penetrant wound of the navicular bursa from a street nail gathered on Aug. 2. Accompanying the intense lameness was a well-marked flow of synovia. The operation was performed according to the technic detailed in the paper above mentioned. When the navicular bone was exposed a small wound in its surface was visible where the nail had entered the articular cartilage. The injured bone tissue at this point, along with the entire articular cartilage was curetted away, the foot carefully dressed and the bandages left undisturbed for nine days. The relief from suffering was very marked, though not so complete as in the succeeding cases, and convalescence was slow, but without noteworthy interruptions, and the animal was ready for slow work, still somewhat lame, on Oct. 4. Nov. 19.—Still nods when trotting down hill.

(27). A gray draft gelding of 1,600 pounds, presented by Dr. Hanshew on Sept. 2, suffering from a penetrant nail wound of the navicular bursa since Aug. 28. Under ordinary handling the patient was constantly growing worse, the suffering was intense, the animal could not touch the foot to the ground, was emaciating rapidly and an abundant discharge of purulent synovia constantly escaped from the wound. When the bursa was laid open it was found distended with purulent synovia and the surface of the bone showed a wound surrounded by necrotic cartilage and bone. The softened, necrotic and inflamed tissues were curetted away and a bandage applied, which remained for ten days. The relief was prompt, complete and permanent. The animal was comfortable and bright the next morning and the excruciating pain had disappeared permanently. When the dressing was removed after ten days the wound was found granulating at every part without suppuration. The patient returned to his accustomed work without lameness on Oct. 26,

54 days after the operation. According to Dr. Hanshew's report, the patient could safely and comfortably have returned to work much earlier, but the animal was quite valuable and a favorite in the stables, and it was desired to give him an extra opportunity to make a complete and safe recovery.

(28). A gray draft gelding, presented by Dr. W. F. Doyle Aug. 31, suffering from an infected wound of the navicular bursa of three weeks' duration, which had been handled on conservative lines, while he was continually growing worse. Brought to the hospital in an ambulance he fell exhausted while being unloaded, and was with difficulty assisted to his feet. There was an abundant discharge of purulent synovia from the nail wound, while in the hollow of the heel there was a second opening resulting from an abscess along the flexor pedis tendon from which also purulent synovia escaped. A probe could be passed through the opening in the heel down into the navicular bursa. The animal was extremely emaciated and was virtually beyond hope of recovery by ordinary handling, and had it not been for the hope held out by the operation, would have been destroyed. Upon opening the bursa the upper side of the flexor pedis tendon was found necrotic and the navicular bone softened, discolored and breaking down over one-quarter of its surface. The necrotic portions of the tendon were carefully removed, the inflamed bone and cartilage curetted away and a large seton of cheesecloth saturated with tr. iodine placed in the fistula extending from the opening in the heel into the operative wound at the navicular bone, and over this the usual bandage applied and allowed to remain undisturbed for ten days. The relief from the excruciating pain was immediate, complete and permanent and convalescence rapid. In four weeks he was walking practically sound and returned to his accustomed work on Oct. 20, 51 days after operation.

(29). A brown draft gelding, presented by Dr. W. F. Doyle on Sept. 5, suffering from purulent infection of the navicular bursa due to a nail wound of three weeks' standing. The patient was in great pain and would not touch the affected foot to the floor, was emaciating rapidly and growing worse under expectant treatment. The operation gave prompt and complete relief and the patient began to place some weight on the foot the next morning, and all seemed to be going well until on Sept. 8, he developed pneumonia, from which he died on the 12th.

Aside from the pneumonia accident, which we consider due to the chloroform, we regard this series of operations as eminent-

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ly successful, whether viewed from the standpoint of animal suffering, economic interests of the owner, or labor involved on the part of the veterinarian; and even with the loss of the one case from chloroform pneumonia, the results seem to us better than available by other lines of management. We shall refer again to the chloroform pneumonia.

D. A SERIES OF QUITTOR OPERATIONS BY THE BAYER METHOD.

*Cases 30-35 operated on by W. L. Williams, 36 by Dr. W. F. Doyle.*

(30). A 2,000 lb. roan draft mare, presented Aug. 4 by Dr. Berns after having been incapacitated for work for sixty days and handled by conservative methods without result. After the removal of the cartilaginous tissues it was found that some osseous tissue (side bone) remained and an attempt was made to remove it, but at one point it was intimately connected with the capsular ligament, and in attempting to separate the two the sage knife penetrated the coronal-pedal articulation opening the joint freely and causing a free flow of synovia. The bandages were allowed to remain undisturbed for nine days, when the wound was found to be granulating without suppuration. Convalescence was uninterrupted and reasonably prompt when the weight of the patient is considered, and on Sept. 14, or 41 days after operation, she was returned to her accustomed work without lameness, false quarter or quarter-crack.

(31). A gray truck mare, presented Sept. 6 by Dr. Berns, after 90 days disability from quittor without result from conservative handling. The operation was without incident and the convalescence without interruption or material infection. She returned to work Oct. 4, 28 days after the operation, without lameness, false quarter or quarter-crack.

(32). A bay draft gelding, presented by Dr. Berns on Sept. 9, after four weeks of disability and fruitless handling by ordinary methods. The case progressed favorably for four days, when chloroform pneumonia developed and the patient died Sept. 16.

(33). A gray draft gelding, presented by Dr. Berns Sept. 7, after 45 days of disability and fruitless treatment. The operation was without noteworthy incident, the convalescence without infection or interruption, and the animal was returned to work on Oct. 5, 28 days after operation, without lameness, quarter-crack or false quarter.



34. A gray gelding, weighing 2,000 pounds, presented by Dr. Berns on Sept. 13, after 40 days incapacity for work and without improvement under ordinary treatment. The operation was without incident except that the anterior lateral ligament of the corono-pedal articulation was partly necrotic and overlapped by an exostosis from the pedal bone. The necrotic ligament was removed in defiance of special cautions by some writers to on no account disturb this ligament or dire results would follow, and the exostosis on the pedal bone was chiseled away. The convalescence was without material interruption, very slight suppuration being present when the bandages were removed in ten days. The patient returned to work on Oct. 17, 34 days after operation, without lameness, false quarter or quarter-crack.

35. A chestnut mare, presented by Dr. McCully Sept. 16, after disability from quittor since Jan. 20, a period of 240 days of fruitless handling by ordinary methods. The coronet was largely destroyed by the necrosis of long duration and the excision of the infected areas left scant horn secreting structures for the restoration of the hoof. Convalescence without material infection and on Oct. 16 she walked four miles without lameness, and on Nov. 1, 44 days, she returned to work without lameness, false quarter or quarter-crack.

36. A gray draft gelding, presented Sept. 16 by Dr. W. F. Doyle with a quittor of 90 days' duration, which had not been benefited by ordinary measures. The operation was uneventful, unless we except that it was the operator's first attempt at this procedure. Convalescence was uninterrupted and the patient returned to his work on the 16th of Oct., 28 days after operation, without lameness, false quarter or quarter-crack.

We have submitted accounts here of seven cases of quittor, (six of which survived), operated on by the Bayer method as understood by the operators, except that the preliminary disinfection by packing the foot in antiseptics for 24 hours prior to the operation was not carried out, and this precaution may have accounted in part for the slight infection in some of the cases, which did not, however, materially protract recovery.

The cases were taken as they came in the regular course of practice in a great city, all had had other methods of treatment applied without benefit for a reasonable time, and when the operations were carried out the usual complications were met and overcome.

It has been reported that the Bayer operation for quittor was

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roundly condemned at the A. V. M. A. meeting at St. Louis in August, although, perhaps, no facts were introduced upon which to base the condemnation. It was claimed, we understand, that the Bayer method is wrong because it involves inevitable false quarter and quarter-crack as a consequence of incising the coronary, but we do not know that the critics ever saw such results. In none of the six cases of this series (one having perished from pneumonia) did we have any very undesirable deformity of the hoof; slight scars, elevations or depressions naturally follow the divisions of the coronary band, but if false quarter or quarter-crack is inevitable, some of the six cases should have shown it. It is certainly quite possible to wound the coronary band in a manner that will prove serious, and there are doubtless plenty of veterinarians who could ruin the foot of a horse in the removal of a lateral cartilage. All it requires is awkwardness, carelessness and dirt to make a failure of this or any other operation. If a clean incision is made through the coronary band, the lips of the wound brought in apposition and maintained and infection is avoided, healing without serious blemish or interference with usefulness occurs: that constitutes the "Bayer" operation and when these results are not attained with reasonable uniformity it is not Bayer's method, but that of the operator; *it is Bayer's operation with Bayer left out*. No surgeon can devise an operation which will not fail in some hands, but why a procedure which has been unhesitatingly recommended by one of the foremost operators in the world, after long and successful experience with it, should be abruptly condemned without trial or evidence it is rather difficult to understand. It is not our task in this paper to show that the Bayer method is the only operation, but merely to show that having decided to operate on these cases a practical method was adopted, and practical results attained. It would be unjust to leave this topic without saying that the results were not the consequence of great dexterity as a result of specialization of the operators. Case 36 was the operator's first attempt at Bayer's quittor operation and the other operator had previously operated on less than half a dozen scattering cases.

In this narrative we have attempted to bring out some of the principal lessons contained, and believe we have shown that the clinic had a great educational value, that the cases were well selected for their utility to the ordinary practitioner and that the results of the operative work were good.

True, these results were marred by three fatalities from

pneumonia, two among horses which had been subjected to chloroform anæsthesia. These two cases have been termed "chloroform pneumonia" as we consider that it may be justly attributed to the anæsthesia. Some will say that we have demonstrated that chloroform anæsthesia is too dangerous to the life of the horse to warrant its use; but there is another view. If we examine the cases from 17 to 36 inclusive, and exclude 24 as a minor operation we have 19 operations, of which 7 cases, 17 to 23, were operated on without chloroform, and 12 cases, 25 to 36, with chloroform anæsthesia. Of the 7 cases, one, 18, died from pneumonia from his violent struggles, which might have been avoided by chloroform, while out of the 12 cases under chloroform two died from chloroform pneumonia; barely a greater per cent. than without the chloroform. If we look again at the character of the operations we find that barring case 18, none of the 7 operated on without anæsthesia were nearly so severe and dangerous in character as the 12 under chloroform, unless we except the castration of the mare where anæsthesia is impracticable, and where again the struggles endangered the life of the patient by inducing infection, so that when the extent of the operations is considered, so far as this clinic shows, there is more danger from pneumonia without than with chloroform. But that is not all. Cases 29 and 32 were operated on prior to the meeting along with a large number of other cases not reported in this list, as we have selected only those which had a definite and important relation to the clinic itself, and in so doing included the only cases of chloroform pneumonia occurring, which makes the danger apparently greater than that really met.

Yet further: In view of the two disasters with chloroform, it was decided to place the administration of chloroform during the clinic proper in the hands of men who were thoroughly familiar with the work, and under their charge no accident occurred.

American veterinarians do not give chloroform to horses, and it is idle for the average practitioner to pretend that he knows how. To administer chloroform properly demands the confidence that only long practice can give.

Chloroform anæsthesia must come more and more into use in our major surgical operations, let him oppose it who will; public sentiment demands it and success in major surgery requires it. The issue is before us and can only be met by learning how to administer chloroform with due safety. Chloroform pneumonia is a real and great danger about which the writer

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has never seen a word in print. Most of us have been taught that the danger to horses from chloroform anæsthesia is from cardiac or respiratory syncope, but the lurking danger of pneumonia to develop four to ten days after its administration is immeasurably greater.

The subject demands our study and the publication of results with every possible explanation of the causes of the dangers.

In the foregoing narrative we have mentioned in connection with each case only the veterinarian presenting it and the responsible operator, but it was everybody's clinic and everybody helped make it the success it was. The hospital facilities of Drs. Berns and Hanshew were freely placed at the disposal of the veterinarians, and these with the assistants of Dr. Berns (Drs. Chas. Atchison and Fox) worked unremittingly and rendered valuable aid to the operators. But all Brooklyn veterinarians did the same thing, so far as opportunity offered, and all worked together as a man, in which they were ably seconded by many of their Manhattan colleagues. It would be unjust to not mention specially the very great contribution to the success of the clinic rendered by Drs. Reed, Stone and Mack by the excellent manner in which they administered the chloroform in all cases of anæsthesia during the meeting.

#### VETERINARY MEDICAL ASSOCIATION OF NEW YORK COUNTY.

Regular monthly meeting called to order Nov. 2, at 8.15 P. M., the President, Dr. J. E. Ryder, in the chair. Owing to the absence of the Secretary when the meeting was called, the reading of the minutes of the previous meeting was dispensed with. Members and visitors present: Drs. F. C. Grenside, C. E. Clayton, J. E. Ryder, R. W. Ellis, E. B. Ackerman, J. L. Robertson, R. Dickson, T. A. Keller, H. D. Gill, W. D. Critcherson, E. A. A. Grange, D. J. Mangan, G. H. Berns, M. J. Dair, T. G. Sherwood, R. S. Mackeller, J. J. Foy, W. H. Lowe, R. A. McAuslin, W. Swan, S. Atchison, A. J. Doncourt, R. H. Kingston, E. A. Durner, J. J. Young, A. Silkman, W. P. Hanifin, W. J. Finn, C. W. Shaw, and J. Wilson, M. D., also students of the N. Y. American Veterinary College, and several other visiting veterinarians.

Dr. Critcherson read a very interesting paper entitled "A Case of Rabies? What! Yes? No?" in which he described a

case of rabies he had met with recently in a horse. His paper was as follows:

A CASE OF RABIES? WHAT! YES? NO?

By W. D. CRITCHERSON, M. D., D. V. S., New York City.

"A bay gelding, six years of age, 16 hands high, weighing about 1,100 pounds, was shipped from Chicago, Ill., to New York City, and on his arrival, July 7th, 1904, was purchased for use as a cab horse. He was worked until July 12th, when he was taken into the hospital lame, due to soreness in the near fore foot. Was re-shod on the 14th and returned to work. July 18th he was lame from bruising of the left knee. On the 21st of July he was returned to work. September 13th he was turned in sick with influenza. The temperature was  $106\frac{4}{5}$ , but it fell to normal in a few days, and on the 22d of September he was returned to work. October 5th had a long drive to Brooklyn and came in sick that night, but on the 9th had recovered and was ordered to be exercised on the following day, the 10th, which was done, and nothing unusual was noticed about him. His general condition was much poorer than when purchased, and arrangements were made for his relief when he should be returned to work, as he was expected to be in a few days. On Tuesday morning, October 11th, he was seen in the course of the usual hospital inspection and ordered to be exercised again. It was in the afternoon before there was an opportunity to exercise him. He was then reported as being down in his stall and unable to get up. He was seen by Dr. Doncourt about four o'clock. At that time he was standing up, and when backed out showed symptoms of vertigo, and his condition was attributed to that. A dose of physic was ordered, but the hospital attendant was unable to give it, as he said that the horse was vicious. On Wednesday, the following day, he was reported as very vicious and had bitten at several of the men, and they were all afraid of him. One man was struck by his teeth on the left forearm, but the skin was unbroken. His condition had been reported to me, but it was about noon before I had an opportunity to see him. As it was considered to be dangerous to enter the single stall in which he stood, he was backed out by Dr. Doncourt, who stood in the next stall. He backed out slowly, turned stiffly and groaned as though in pain. In walking, his actions indicated spinal meningitis, swaying of the body and crossing of the hind legs, but the slow dragging of the toes of the hind feet was absent. He was walked for several minutes



and moved a little better than at first. A pail of water was offered him and he plunged his mouth fiercely into it, drinking several swallows. At this time there was no attempt to bite, but from the statements of the men I looked with suspicion upon him, and ordered him to be put in a box stall under lock and key. The hostler led him into the box and had to turn him somewhat to get out. The horse groaned, grunted and tried to bite him. The temperature at this time was 101°; otherwise he seemed to be normal. I ordered a dose of oil to be given if possible, but he fought, bit and got so excited the idea was given up. About six o'clock that evening I saw him again. He was then laying on his right side against the door of the stall. I struck him on the side with a stick and he immediately turned and bit at it. He would bite and snap every time he was struck or the stick was pointed at him, but he would not get up. On the following morning, Thursday, he was down on the left side, but the men said that he had been up and staggered around the stall. When struck or teased with a stick he would snap and bite. He also bit his side, shoulder and breast. A pail of water lowered into the stall would excite his frenzy. He would bite at it, upsetting it, and spilling the water. If he happened to plunge his mouth into the pail he would attempt to drink, but it would be turned over and the water thrown out before he could get any. He would then strike and bite the pail several times and then refuse to notice it or push it out of the way with his nose, but any new object, like a broom or stick, presented to him he would seize, biting and grinding his teeth. At this time he was unable to get up, but would roll upon his sternum, where with front legs extended he would at times, raise his head, extending his neck, erect his ears and point them forward. In this position, with his eyes bright and looking straight ahead, he impressed me as on the alert, listening and looking for something in the distance. The attitude of the head and neck reminded me of the position of a deer in the forest in the act of scenting or anticipating danger.

"Through the day the paroxysms of frenzy diminished in violence and the paralysis of the posterior extremities and trunk gradually increased. On Friday he was much weaker and less violent. Attempted to get up, but was unable to even roll up onto his sternum. Was excited as before by lowering a pail and teasing with a broom or stick, but attempts to bite were not as vicious. Paralysis extending, unable to raise his shoulders and later his neck. He now began to paw and thrash his front feet



similar to a case of azoturia. His penis protruded from the sheath and when struck a small quantity of urine would be passed. Only one passage of dung was noticed during 48 hours. At three o'clock Friday afternoon the paralysis was nearly complete and he was unable to lift his head from the floor. Would still bite at the floor of the stall or any object presented to him, but with much less force and violence. His lips and gums were cut and bleeding in several places. The temperature at this time was  $104\frac{2}{5}$ . He was destroyed by bleeding. Dr. Kingston opened the cranial cavity to enable Dr. Poor, of the Health Department, to obtain sections for observation and inoculation. The results will be given in due time. The body was then sent to Dr. Gill's, and Dr. Kingston will kindly furnish the results of his labor in the case. I can find no evidence that he was ever bitten by a dog.

"I had never seen a case of rabies, and while, according to the text-books, the picture is not complete, I believe I am justified in my diagnosis, which I admit has been made by exclusion. Hence the heading—'A Case of Rabies? What! Yes? No?'"

Dr. Critcherson had invited several practitioners to visit the case and give their opinions.

Dr. Gill, who had seen the case, said that the symptoms he saw were just the same as described by Dr. Critcherson, and that he could not add anything to what had been said, but that in his opinion he thought the animal was suffering with rabies. He mentioned a case of a small cob which he was called to see a few days ago, who had always been very docile, and never showed any viciousness until this time, when it was noticed that the animal acted strangely, snapping, pawing, and running to the side of the stall biting at the iron bars. When its halter was touched it tried to nip the hand. Pulse normal, but a little hard, temperature  $102^{\circ}\text{F}$ . In trying to administer sedatives, the animal snapped and broke the syringe. Dr. Gill became suspicious, and when he called the next morning he found the horse frantic, beyond control, and all the symptoms more aggravated; the animal having broken its teeth in biting the bars on the stall. It gradually grew worse and died this morning. The doctor sent the animal's brain to the Health Department's laboratory and he will report the result of the examination later. There was no history of a dog-bite in this case, only that the cob was turned out on grass during the day and taken in the stall at night. Dr. Gill does not think we will find a typical

train of symptoms in each case ; but that symptoms vary in the different horses.

Dr. Robertson stated that all he could say was in corroboration of what had been said regarding Dr. Critcherson's case ; the horse was down when he saw it.

Drs. Clayton and Ellis each saw the case of Dr. Critcherson. Dr. Ellis said he might add that he saw the animal drink water nice and quietly, and he doubted, with Dr. Clayton, that the animal was suffering with rabies.

Dr. Grenside thought Dr. Critcherson's case looked like one of rabies, and he recited a case, where the owner of the horse had a dog which died about a month before, in a suspicious manner ; therefore, he concluded there was some connection between the dog's death and the horse's condition.

Dr. Lowe saw two cases which he was satisfied were rabies in the horse, one of which was determined by animal inoculation.

Dr. Grange mentioned that he saw cases of rabies in cattle, and said that the symptoms varied in the different temperaments.

Dr. Shaw has had several cases in the horse which he thinks were rabies.

Drs. Ackerman and Berns took part in the discussion.

Dr. Critcherson then read a letter which he received from Dr. D. W. Poor, of the Health Department laboratory. Dr. Poor in his letter said that he made a positive diagnosis of rabies in the case of the horse which was reported by Dr. Critcherson, and that the brain tissue showed the changes characteristic of rabies. The four guinea-pigs inoculated from an emulsion of the tissue have shown all the pronounced symptoms of the disease.

Dr. Wilson, of the Health Department laboratory, who represented Dr. Poor, and is his associate in laboratory work, said in response to various questions, that the period of incubation is from 10 days to  $3\frac{1}{2}$  months, averaging about  $2\frac{1}{2}$  months. He described the method of animal inoculation in guinea-pigs and rabbits, and said that when these animals were inoculated with a fixed virus they came down with the disease in six days and died on the tenth day, while the street virus has a more indefinite period of incubation, and added, the nearer the seat of inoculation of street virus to the cerebral centres, the shorter the period of incubation. In other words, if the bite or inoculation is made on the face, the period is shorter than if it was on the extremities. Statistics show, he said, that 16 per cent.

bitten by rabid animals develop hydrophobia; 82 per cent. of the 16 per cent. are cases which have been bitten on the face or head, the remaining per cent. receiving the bite on the extremities, or elsewhere. Dr. Wilson described briefly the Pasteur treatment, and said that the mortality in persons who have received this treatment and where it has been proved conclusively that they were bitten by a rabid animal, is not quite 1 per cent., which speaks well for the Pasteur treatment. He also spoke about Negri's bodies that are found only in rabid brain substance, which show distinctly when stained with methylene-blue and eosin; these bodies resemble protozoa. Drs. Poor and Williams at the laboratory have found them, or at least think so. Regarding cauterization he said that the actual cautery or fuming nitric acid are the only reliable agents in cauterizing wounds inflicted by rabid bites, providing they are applied within twenty-four hours. Other agents as lunar caustic, carbolic acid, or formalin are of no use. Dr. Wilson does not believe that lemon juice has any effect in destroying the virus of rabies.

Dr. Critcherson closed the discussion on the subject of rabies. It was regularly moved, seconded, and carried that a vote of thanks be extended to Dr. Wilson and Dr. Poor, and that a notice of such vote of thanks be written to Dr. Poor.

A cordial note of thanks was extended to Dr. Critcherson for the instructive paper which he presented to the meeting.

Dr. Robertson opened the discussion on "Colics, and Their Treatment." He spoke briefly on the causes of colics and reviewed the various treatments preferred by different veterinarians.

Dr. Ackerman stated that he has used arecoline lately and has found it very successful in the treatment of flatulent colics. He uses the Buntin Company's  $\frac{1}{2}$  grain to 1 grain tablets, in two drachms of water and injects intra-tracheally. Within eight minutes, and exceptional cases fifteen minutes, there is a rapid evacuation of fæces and flatus; in a short time fermentation ceases. A second dose can be administered in a half hour if the case demands it. The doctor said that in his cases, the extra pain caused by arecoline is very slight. In answer to a question of Dr. Lowe, Dr. Ackerman said that he only uses arecoline in flatulent colics and not in cases of obstinate constipation.

Dr. Grange has used eserine alone and in small doses, and has found it to act nicely. He uses Merck's preparation.

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Dr. Atchison had good results in colics from common salt; he guaranteed that this treatment will not kill the patients.

Dr. Berns has used barium chloride successfully in 15 grain doses to two drachms of distilled water, heated to 98° or 101° F., injected intravenously.

In two fatal cases that he had, Dr. Berns attributed their deaths not to the barium, but to the cold water used in dissolving it; probably causing a clotting of the blood within the heart.

Dr. Ryder mentioned that he used one grain of arecoline hypodermically in a case of colic, where the pain increased, got some flatus, profuse salivation, and the animal died.

Dr. Clayton spoke about stomach tubes in the treatment of flatulent colics.

Drs. Mackellar, Critcherson, Keller, Grenside, Dickson, Lowe, and Mangan gave their views and experiences with colics.

Dr. Robertson closed the discussion on the subject.

The President extended to the visitors a cordial invitation to attend the next meeting of the Association.

Meeting adjourned.

D. J. MANGAN, *Secretary*.

#### CALIFORNIA STATE VETERINARY MEDICAL ASSOCIATION.

The regular quarterly meeting was held on September 14 in the lecture room of the San Francisco Veterinary College, 510 Golden Gate Avenue, San Francisco.

There were forty enthusiastic members present, besides a number of interested visitors. Dr. E. J. Creely, dean of the college, had arranged a clinic for the afternoon, which was carried out to the letter, and was voted very instructive. The following was the programme: Dr. Lewis C. Dean, professor of ophthalmology in the San Francisco Veterinary College, operations with demonstrations on the eye; Dr. George Brady, professor of bacteriology and microscopy of the same institution, demonstrated methods employed in scientific autopsies; Dr. E. R. Mathers, of Indiana, exhibition of ear cutting in dogs with clamps; Dr. R. A. Archibald, of Oakland, performed the operations for quittor and cunean tenotomy; Dr. J. J. Hogarty, professor of anatomy, performed ovariectomy on a bitch; Dr. H. A. Spencer, of San José, castrated a ridgling; Dr. P. H. Browning, of San José, gave an exhibition of oöphorectomy in the mare.

After the clinic the members adjourned to the Poodle Dog



restaurant, where a banquet had been prepared with fifty covers, and mirth and goodfellowship reigned until 8 P. M., when President Charles H. Blemer, ex-State Veterinarian, called the meeting to order. The regular routine business was transacted, after which essays were read by Dr. G. F. Faulkner, of Salinas, on the eradication of the Texas tick and Texas fever in Monterey county, of which place he is the county veterinarian. Dr. George J. Donnelly, of Oakland, gave a paper on sanitary work relative to the testing and destruction of glandered horses in and about Niles and Centreville, which has been found to exist in that locality to quite an alarming extent. Dr. H. F. Spencer, of Sacramento, addressed the meeting upon "Foot-and-Mouth Disease in Cattle," which exists in a benign form in that county and other contiguous localities to quite an extent; Dr. George Locke, of Lockford, reported several interesting cases.

Dr. Charles Keane, the recently appointed State Veterinarian, addressed the members upon sanitary police and contagious diseases. The doctor particularly desired that the veterinarians from the different counties of the State should endeavor to impress the supervisors of their districts and also their clientele with the importance of reporting at once any outbreak of a contagious character among the domestic animals.

This being the regular meeting for the nomination of officers for the ensuing year the following names were offered: For President, Dr. R. A. Archibald of Oakland, Dr. James Sullivan of Suisun, Dr. Carl Fisher of San Mateo; for Vice-President, Dr. G. F. Faulkner of Salinas, Dr. J. B. Boomer of San Francisco; for Secretary, Dr. P. H. Browning of San José; for Treasurer, Dr. W. F. Egan of San Francisco; Board of Examiners, three to elect, Dr. H. A. Spencer of San José, Dr. D. F. Fox of Sacramento, Dr. E. J. Creely of San Francisco, Dr. Archibald Ward of Berkeley, Dr. George Locke of Lockford, Dr. H. F. Spencer of Sacramento and Dr. T. E. Carroll of Chico.

The meeting then adjourned to meet Wednesday, December 14, 1904.

P. H. BROWNING, *Secretary*.

### KANSAS STATE VETERINARY MEDICAL ASSOCIATION.

The Kansas State Veterinary Medical Association meets in Topeka, January 10.



This being our first annual meeting, we are going to have a grand meeting; we have a good programme arranged, both clinical and literary. Dr. Moore, of the K. C. V. C., has volunteered to come and bring his operating table, and assist in every way possible. Of course anyone who knows Dr. Moore knows that if he is anywhere within reach he would help all he could; he is built just that way. The Association has some exceedingly important business to transact at this meeting, and we hope to see every veterinarian in the State present. The Secretary is sending a notice of the meeting to every one he can learn of, so if anyone in the State reads this, he may just consider himself invited by special invitation, and come.

Drs. Pritchard and Knisely are looking to local arrangements and when you arrive in Topeka just ask for their infirmary and you will be well cared for.

I wish the different veterinary associations throughout the United States and Canada would designate the REVIEW as their official paper, and then give notice of meetings and other such important business through its columns. No up-to-date veterinarian should be without it; its circulation in the United States should tally with the number of graduate veterinarians. Thanking the REVIEW for past favors, we promise to report after the January meeting.

HUGH S. MAXWELL, *Secretary*.

#### MASSACHUSETTS VETERINARY ASSOCIATION.

The regular monthly meeting was held at the Boston Veterinary Hospital, Wednesday evening, Oct. 26th, at 8 P. M. There were five members present. On motion of Dr. Winslow, seconded by Dr. Howard, the minutes of the previous meeting were accepted as read. Dr. Lewis C. Weeks, of Falmouth, was elected a member. Dr. Howard gave an interesting account of the New York meeting, held at Brooklyn, Sept. 13-15. Adjourned 9.45 P. M.

F. J. BABBITT, *Secretary*.

DR. MAYO HURT IN A WRECK.—Among those injured in the big wreck on the Missouri Pacific at Tipton, Mo., Sunday morning, was Dr. Mayo, veterinary department State Agricultural College at Manhattan, whose back and neck was sprained. Dr. Mayo is well known here. He has given up his place in the college at Manhattan and goes to Cuba to take a position similar to the one he held in the Agricultural College.—(*Junction City, Kan., Union, Nov. 4.*)

## NEWS AND ITEMS.

I APPRECIATE your magazine from start to finish.—(*M. C. Livesay, St. Johns, Mich.*)

DR. H. F. PALMER is now in the West in the interest of Parke, Davis & Co. He will make his headquarters in Denver at 2623 High Street, where his family are at present.

DRS. WM. SHEPPARD, Thomas G. Sherwood, and J. Elmer Ryder officiated as veterinarians to the recent Madison Square Garden Horse Show.

DR. WM. H. PENDRY, of Brooklyn, N. Y., was elected to the Assembly at the recent election. He represented his district in that body two years ago.

RABIES IN TURKEY.—The disease is frequent, and the Pasteur treatment is resorted to—with a mortality of 30 to 31 per 100. In 1901, 700 persons were inoculated; in 1902, 800; and 1903 more than 1000.

CARNAVAL COSTUMES.—Two Italian physicians have examined 42 costumes, let out in the last carnival, and found among numerous bacilli, those of tuberculosis, in such quantity that out of 8 animals inoculated, all took tuberculosis.

MARK WHITE, JR., V. M. D., U. P., '04, Denver, Colorado, is the veterinary editor of *Outdoor Life*, published in that city. At the matinee trotting races held recently the Doctor officiated as one of the judges.

HORROR.—In analyzing the water of a public bath establishment in Liverpool, Glisson states that this water removes from the skin of each bather from 4 to 6 millions of bacteria. The most numerous are *Staphylococcus albus* in all its varieties.

DR. C. A. LESLIE, O. V. C., '03, is nicely located at Deadwood, S. D. He is veterinarian for the Homestake Mining Co., who have immense interests at Lead and Deadwood. The Doctor says he often operates on horses in the mines, when they are 1,500 feet below the surface level.

BURROS FOR PHILIPPINES.—The army transport *Dix* on her next trip to Manila will carry a lot of burros, which will be used in the islands as pack animals to take the place of the carabao, whose skin has been found to be too delicate to sustain the weight of burdens and the pressure of supports.

"JONES, do you happen to know anyone who has a horse for sale?" inquired Brown. "I have reasons for believing that

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Green has," replied Jones. "Why do you think so?" "Because I sold him one yesterday."

DR. JUDSON BLACK, the efficient Secretary of the Michigan Veterinary Medical Association, was confined to his bed for two weeks in November with an attack of malarial fever, but is now a safe convalescent.

W. D. WRIGHT, M. D. C., formerly Meat Inspector at Ft. Worth, Texas, sailed from Seattle, Wash., for Manila, where he has accepted an appointment as Veterinarian, Bureau of Insular Affairs, Philippine Islands.

"I HEAR YOU want to sell your dog, Pat. They tell me he has a pedigree." "Sure, an' Oi niver noticed it, sor. Anyhow, he's nothin' but a puppy yit, an' Oi'm thinkin' he'll be afther outgrowin' it, sor."

DRS. MAYO, of Cuba; Van Es, of the North Dakota Agricultural College and Experiment Station, and Reynolds, of the Agricultural College of the University of Minnesota and Experiment Station, attended the recent meeting of the Association of Agricultural Colleges and Experiment Stations at Des Moines.

THE DISTRICT MEDICAL SOCIETY OF CENTRAL ILLINOIS at a recent meeting held at Pana, Ill., appointed a committee of three to amend their By-Laws so as to admit to associate membership veterinarians that are graduates of recognized and regularly constituted veterinary colleges, druggists, doctors of dental surgery, and chemists. This action upon the part of the medical association is a step in the right direction, and we commend it to the consideration of other similar organizations.

THE DISADVANTAGES OF RAPID DIAGNOSES.—"I'm in a hurry," called the doctor, "and can't stop to see you, but it's all right—you haven't got it." "Haven't got what?" demanded the astonished artist. "Whatever it is you think you've got. Not a symptom of it. Good-by." And he drove away. "Well, now," said Levering, turning to a lamp-post as the only witness of the scene, "that's the time he's mistaken. I have got it—ten dollars in my pocket to pay his last bill; but if he's sure I haven't I'll try to get in line with his diagnosis." And he went around to the nearest junk shop and invested the money in a pair of brass candlesticks and a copper kettle.

TRITE SAYINGS.—A budding genius frequently develops into a blooming idiot. . . . The fellow who dabbles in trotting stock sometimes degenerates into laughing stock. . . . Because a man never kicks is not a sure sign that he is contented. He may be lazy. . . . It is hard luck when the wheel

of fortune gets a punctured tire. . . . The same stuff that gives a man a strong breath will weaken his powers of judgment. . . . Standing pat is better than laying down anyhow, although it may, at times, be more painful. . . . One of the best things to do before we criticize others too much is to begin an intelligent study of ourselves.

**VACCINATION IN TUBERCULOSIS.**—Maragliano states his belief that specific treatment is possible in tuberculosis, and that it is possible to render human beings immune against the disease. He describes his experiments minutely, and speaks of the properties of his serum which benefits the general condition of tuberculous patients and acts upon the local lesion, especially in early cases. He reports 2,899 cases, in some of which a cure has lasted from seven to nine years at the present time. Maragliano says one should not expect too much from serum treatment and not much more than from other well recognized methods of treatment. He then describes his method of producing immunity. Recently, he has attempted an actual vaccination by evoking a peripheral focus of tuberculosis without living tubercle bacilli to bring about actively the protective agency.—(*Berlin. Klinische Woch.*, June 13.)

**THE RIDING SCHOOL SEASON IN NEW YORK.**—The riding academies are making elaborate preparations for a great winter's business, and when the National Horse Show shall have passed into history—the Thanksgiving turkey eaten, and the football games of 1904 become a pleasant memory, the merry clatter of the hoofs of more than 2,000 saddle horses will resound throughout the six riding academies of which New York and its suburbs can boast. With the modern luxuries which constitute the furnishings of these academies they are in fact the nearest approach to an ideal life of pleasureable pastime which modern civilization has produced. No scene is more dazzling in its brilliancy than the arena of a well-appointed riding academy filled with merry-making men and women mounted on thoroughly trained saddle horses whose every movement is the poetry of motion, and who seem to enter into the evening's pleasure with as much enthusiasm as the riders themselves. Add to this music, and fancy costumes for the riders, and brilliant equipments for the horses, and such a picture of loveliness and animation is presented as can scarcely be found elsewhere.—(*Correspondence Breeder's Gazette*.)

**DR. DAVISON'S LOSS.**—The Altamont Stock Farm at Millbrook, Dutchess County, N. Y., owned by G. Howard Davison,

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of this city, was partially destroyed by fire yesterday. Mr. Davison sent a telegram to Poughkeepsie last night which said that five of the barns at Altamont had been burned, and "with them many tons of hay and grain, cows and pigs. The loss is covered by insurance." Since last Sunday's storm Millbrook has been cut off from telephone communication and no further details could be obtained last night. Mr. Davison was recently named by President Roosevelt as Assistant Secretary of Agriculture. His New York residence is at 52 East Forty-ninth Street. G. Howard Davison showed four ponies at the Horse Show last week. They were Lady Orme, Tally-Ho, Myrtle and Bo-Peep, and between them they won one second and one third prize, of the total value of \$70. Mr. Davison has been well known for years as a breeder of ponies and has some very fine stock which at former shows was very successful. The ponies that were in the recent show started for home yesterday, and it is doubtful if they had arrived when the fire started.—(*N. Y. Sun*, Nov. 21.) [Dr. Davison is a member of the veterinary profession, holding the diploma of the American Veterinary College, 1890. His selection for the high office of Assistant Secretary of Agriculture by President Roosevelt is very gratifying to the profession of the country, and we wish him success in his new estate.—EDITOR REVIEW.]

**SWINE TUBERCULOSIS.**—State Veterinarian Leonard Pearson, of Pennsylvania, has the following letter in the *Breeder's Gazette* of Nov. 9: "*To The Gazette.*—Those who pay careful attention to the distribution of tuberculosis have known for years that this disease is becoming more prevalent among swine in many parts of the country. Nearly 20,000 hogs were condemned in this country last year by meat inspectors on account of tuberculosis. From the statement of Frank Bixby in your issue of Oct. 19 it appears that loss from this disease is becoming something of a burden to hog slaughterers. Tuberculosis of swine has been increasing from year to year and little, very little, has been done to check it. Before effective action can be taken to repress a disease it is necessary to determine the means by which it spreads. This knowledge has been very carefully worked out in regard to tuberculosis of swine, both in this and in other countries. It is interesting and important to know that tuberculosis rarely spreads from hog to hog. The reason for this is that a living tubercular animal cannot infect an animal in association with it until the disease has reached such a stage that tissue in parts of the body in communication with



the exterior is being destroyed and cast off, most frequently from the lungs. Now it happens that hogs usually die of tuberculosis before the disease has reached this stage. That is, the disease may attain a wide distribution in the body and cause death before the tissues have melted down preparatory to being cast off. Tuberculosis never originates spontaneously or from bad conditions of life alone. It can be produced only by the specific germs of this disease. We can protect our hogs by preventing the access of these germs. From what source do they come? Mr. Bixby is quite right in stating that the feeding of offal may cause tuberculosis. But it is not dead horses, among which tuberculosis is almost unknown, but the offal of animals that were affected with tuberculosis that is dangerous. The small slaughter house in the village or country, with its herd of scavenger hogs, has much to do with the propagation of this disease. Only a short time ago a country butcher who feeds offal told me that he could not keep hogs more than two months, for they die of tuberculosis. But this is not the chief cause of the trouble. All experience teaches that the most important factor in the production of swine tuberculosis is the milk of tubercular cows. That tuberculosis of pigs may readily be caused by feeding the milk of tubercular cows has been abundantly demonstrated by numerous carefully controlled experiments. Observation on a large scale in districts where there are infected herds and where much skim milk is fed to pigs also furnishes convincing proof of this fact. But perhaps an even more perfect demonstration is supplied by the experience of Denmark and parts of Germany. Tuberculosis of swine was formerly very common. In the same districts it is now extinct or quite rare, while all conditions remain the same and no repressive measures have been put in force excepting that it is now required by law that slime from the separator bowls shall be burned and that the skim milk be heated to destroy tubercle bacilli. Infected milk from the herd of one creamery patron may lead to the occurrence of tuberculosis among the swine and, indeed, among the calves of a large proportion or of all of the patrons who return skim milk from the creamery to their farms for feeding. One unfortunate, ignorant or negligent man in a community may in this way do much harm to his neighbors. Protection comes through the use of the farm separator, through the pasteurization of skim milk at creameries or, best of all, through the eradication of tuberculosis of cattle.

“[Signed]      LEONARD PEARSON.”

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## VETERINARY MEDICAL ASSOCIATION MEETINGS.

In the accompanying table will be found the dates, places of meeting, and Secretaries' names and addresses of all the Veterinary Medical Associations of the United States and Canada, so far as obtainable by the REVIEW. Secretaries are urgently requested to see that the organizations which they represent are properly included in the list.

Name of Organization.	Date of Next Meeting.	Place of Meeting	Name and Address Secretary.
American V. M. Ass'n.....	August, 1905	.....	J. J. Repp, 5249 Addison St., Phila., Pa.
Vet. Med. Ass'n of N. J.....	Jan. 12, 1905.	Newark.	G. W. Pope, Athenia, N. J.
Connecticut V. M. Ass'n.....	1st Tu. Feb., '05.	Hartford.	B. K. Dow, Willimantic.
New York S. V. M. Soc'y....	September, 1905	Ithaca.	W. H. Kelly, Albany, N. Y.
Schuylkill Valley V. M. A....	Reading.	Dec. 21, 1904.	W. G. Huyett, Wernersville.
Passaic Co. V. M. Ass'n.....	Dec. 6, 1904.	Paterson, N. J.	H. K. Berry, Paterson, N. J.
Texas V. M. Ass'n.....	.....	.....	H. D. Paxson, Ft. Worth.
Massachusetts Vet. Ass'n.....	Monthly.	Boston.	F. J. Babbitt, Lynn, Mass.
Maine Vet. Med. Ass'n.....	Jan. 11, 1905.	Augusta.	C. L. Blakely, Augusta.
Central Canada V. Ass'n.....	.....	Ottawa.	A. E. James, Ottawa.
Michigan State V. M. Ass'n....	Feb. 7 8, 1905.	Lansing.	Judson Black, Richmond.
Alumni Ass'n N. Y.-A. V. C....	April, 1905.	141 W. 54th St	W. C. Miller, N. Y. City.
Illinois State V. M. Ass'n.....	December.	Chicago.	W. H. Welch, Lexington, Ill
Wisconsin Soc. Vet. Grad.....	Call of Pres't.	Racine.	S. Beattie, Madison.
Illinois V. M. and Surg. A....	.....	.....	W. A. Swain, Mt. Pulaski, Ill
Vet. Ass'n of Manitoba.....	.....	.....	F. Torrance, Winnipeg.
North Carolina V. M. Ass'n....	.....	.....	T. B. Carroll, Wilmington.
Ontario Vet. Ass'n.....	December, 1904	Toronto.	C. H. Sweetapple, Toronto.
V. M. Ass'n New York Co....	1st Wed. ea. mo.	141 W. 54th St	D. J. Mangan, N. Y. City.
Ohio State V. M. Ass'n.....	Jan. 17-18, 1905	Columbus.	W. H. Gribble, Washington C. H.
Western Penn. V. M. Ass'n....	1st Wed. ea. mo.	Pittsburgh.	F. Weitzell, Allegheny.
Missouri Vet. Med. Ass'n.....	August, 1905	Kansas City.	F. F. Brown, Kansas City.
Genesee Valley V. M. Ass'n....	.....	.....	J. H. Taylor, Henrietta, N. Y.
Iowa State V. M. Ass'n.....	.....	.....	H. C. Simpson, Denison, Ia.
Minnesota State V. M. Ass'n..	.....	.....	J. G. Annand, Minneapolis.
Pennsylvania State V. M. A....	.....	.....	C. J. Marshall, 2004 Pine St., Phila.
Keystone V. M. Ass'n.....	2d Tuesday of each month.	Philadelphia.	C. J. Marshall, 2004 Pine St., Phila.
Colorado State V. M. Ass'n....	1st Mon. in June	Denver.	M. J. Woodliffe, Denver.
Missouri Valley V. Ass'n.....	Jan. 11-12, 1905	Kansas City.	B. F. Kaupp, 3712 Michigan Ave., Kansas City.
Rhode Island V. M. Ass'n....	.....	.....	T. E. Robinson, Westerly, R. I
North Dakota V. M. Ass'n....	2d Tues. Jan.	Fargo.	E. J. Davidson, Grand Forks
California State V. M. Ass'n....	Mch. Je. Sep, Dec	San Francisco	P. H. Browning, San Jose.
Southern Auxiliary of California State V. M. Ass'n....	Jan. Apl. Jy, Oct.	Los Angeles.	H. D. Fenimore, Los Angeles
South Dakota V. M. A.....	.....	.....	E. L. Moore, Brookings.
Nebraska V. M. Ass'n.....	.....	.....	A. T. Peters, Lincoln.
Kansas State V. M. Ass'n....	Jan. 10, 1905.	Topeka.	Hugh S. Maxwell, Salina.
Ass'n Médecine Vétérinaire Française "Laval,".....	1st & 3d Thur. of each month.	Lect. R'm Laval Un'y Mon.	J. P. A. Houde, Montreal.
Alumni Association A. V. Col..	April each yr.	New York.	F. R. Hanson, N. Y. City.
Province of Quebec V. M. A....	March, 1905.	Mon. & Que.	Gustave Boyer, Rigand, P. Q.

## PUBLISHERS' DEPARTMENT.

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SPRATT'S IN THE LEAD as usual where dog and poultry shows are concerned, have been awarded the contracts to pen, feed and otherwise fit up the poultry shows to be held at Hackensack, N. J., Dec. 8th and 10th, and Rutherford, N. J., Dec. 15th to 17th; and from the following it will be shown how they have become "an authority" on the preparation of balanced rations not only for dogs, cats and poultry, but also adepts in the development and preparation of foods for the valuable inmates of our zoölogical parks:

NEW YORK ZOÖLOGICAL PARK. UNDER THE MANAGEMENT OF THE  
NEW YORK ZOÖLOGICAL SOCIETY. WILLIAM T. HORNADAY,  
DIRECTOR, 183D STREET AND SOUTHERN BOULEVARD.

NEW YORK, August 6th, 1904.

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GENTLEMEN:—We enclose herewith another order for your Forage Biscuits, which now meet our views to an extent that is very gratifying. We feel really indebted to you for the pains you have taken in developing this product to correspond with our samples and our peculiar wants, as we find these biscuits very beneficial for our giraffes, African antelopes generally and other particularly valuable hoofed animals. The bears, also, are very fond of them. Yours very truly,  
(Enc.) (Signed) W. T. HORNADAY, Director.

THE ZENNER DISINFECTANT COMPANY, offer to any reader of the AMERICAN VETERINARY REVIEW, their beautiful calendar for 1905. We have seen this reproduction, in many colors, of their famous picture, "Little Miss Zenoleum," and it certainly is a gem of beauty that will delight every veterinarian, to hang in his office or home.

MESSRS. ATKINS AND DURBROW, NEW YORK, manufacturers of RED BALL BRAND STOCK FOOD, differ from manufacturers of stock foods in general, in that they furnish to veterinarians, on application, the formula from which their food is prepared, hence it is not a secret preparation, and veterinarians may know what they are prescribing when advising it. That is one side of the question; the other is, that its use demonstrates to the practitioner its excellence as a digestive tonic. It is also a convenient vehicle for disguising bad tasting worm medicine, being itself decidedly pleasant to a horse's palate, and for the same reason, is useful in inducing horses to resume eating that, while not really sick, have gone "off their feed." Most horses will eat this food greedily, and once having tasted it, anything that it contains.